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THE THEORY AND EFFECT OF VACCINE THERAPY IN TYPHOID FEVER, WITH REPORT OF CASES.*

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Among those acquainted by personal experience or through the reports of other workers with the results obtained by the use of typhoid vaccine as a prophylactic measure, there are probably but few who would now question the proven efficacy of this means in establishing an immunity against typhoid fever.

Extensive experience in the British, German, and American armies, by State boards of health, and also in numerous public and private institutions in this country and abroad, has proved positively in the last three years that typhoid can be prevented by proper vaccination. Immunity has been established for periods ranging from two and a half to three years according to Russell,[1] and three to six years according to Stone.[2] As agglutinins are found present just as long after inoculation as following an attack of typhoid fever, there is every reason to believe in an immunity following inoculation equal in duration to that conferred by a natural infection.

Under any circumstances it is now recognized that the so-called immune bodies cannot be considered as an evidence of an established immunity, but only as an indication of the tissue resistance to some active infectious process. Theobald Smith[3] states that nature cannot be expected, following a few injections of vaccine, to develop antibodies sufficient to cause an indefinite immunity; for nature is not accustomed to elaborate many unused commodities. Moreover, it is too much to expect a vaccine to maintain immunity and at the same time to counteract the effects of a debilitating environment, exhaustion, exposure, or lack of nutrition. It is a question whether vaccination during the Spanish war would have met with as brilliant results as are at present obtained in the United States army under far more favorable conditions.

With the knowledge gained of the process of immunization and the further knowledge of the process of nature's efforts in conquering typhoid infection, it is reasonable that investigators were led on by the stimulus of success in prophylaxis to make use of typhoid vaccines as a therapeutic means. If there is a possibility by this method of lowering the death-rate and diminishing the chances of relapse, then surely does it deserve our attention and serious consideration.

The treatment of typhoid fever has always been symptomatic and supportive. No medicinal treatment has been found to influence the course of the disease. The mortality, depending in part upon the changing virulence of different epidemics, has maintained through every method of treatment a heretofore irreducible minimum of not less than 10 per cent and more often reached the higher average of 15 per cent, and in the more virulent epidemics 20 per cent. The United States stands to-day the

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nation preëminent in typhoid mortality. In the past six or eight years, however, the situation has become more creditable, and in some communities satisfactory and encouraging. This new condition has come about owing to the wide-spread reforms in sewage disposal and in the purification of the water and milk supply.

A recent article[4] has shown that in the 50 cities in the United States of over 100,000 population the typhoid mortality rate in 1912 was 15.1. In 1911 typhoid fever claimed in this country a death toll of 12,450, or a mortality average of 21 per 1000 deaths from all causes.

History.—Sir A. E. Wright in the middle 80's demonstrated the process of immunization, and discovered certain substances in the blood-serum and tissue juices which he named agglutinating, bactericidal, antitoxic, and opsonic antitropins; and he emphasized the first two substances as the principal agents of the defense. He discovered also that these substances could be increased by inoculations with killed bacteria. In the special field of typhoid inoculation it was Fränkel and Simonds in 1887 who reported successful experiments in the immunization of rabbits against typhoid fever. In 1893 Fränkel reported similar experiments upon man, followed in 1896-97 by Pfeiffer, Kolle, and Wright, who reported almost simultaneously successful typhoid inoculation upon man. Faulty methods, false premises, and prejudice obstructed real progress, and for some time after both theory and practice in typhoid inoculation were discredited. The negative phase of Wright, a lowered opsonic index following a short time after each inoculation, in which a subject was made more liable to the infection, did much to discourage and retard progress in typhoid immunization.

It has been proved since, however, that the negative phase or period of impaired body resistance, save in most excessive doses, is non-existent in typhoid inoculation. Hunt,[5] however, believes, from experience gained in State vaccination work, that the danger of a negative phase following inoculations during the incubation period of so-called potential cases is not wholly absent; and Smith warns that excessive doses may break down nature's balance between natural immunity and the infectious disease process. For a vaccine is effective only in proportion to the natural resistance already present.

Within the past eight years, beginning with Wright's pioneer work in immunization with the British army, typhoid inoculation has been placed upon a sounder footing, first as a prophylactic measure and more recently in treatment, and although in the latter respect it is still to some extent in an experimental stage, nevertheless it has proved its worth in both fields.

Pathology.—Typhoid fever is a bacteriemia primarily caused by a bacterial invasion of the intestinal tract, with particular selection of the intestinal lymph follicles, mesenteric lymph glands, and the spleen; from these initial foci the infection is carried by the blood stream to the liver, kidney, spleen, and bone-marrow. In these organs the typhoid bacilli develop, and from thence are fed into the general circulation.

Theory.—The theory of vaccine therapy in typhoid fever, first defined by Wright, has been referred to above, namely, his discovery that immune bodies in the blood could be increased by injection of bacterial vaccines or antigens. Pfeiffer and Kolle in 1896 pointed out the increase in bactericidal elements of the blood-serum following typhoid inoculation in immunization, and found a more marked and constant increase of these bacteriolytic substances than that conferred by an attack of typhoid fever. They reported as a result of their investigation: Bacteriolysis was well marked; the serum contained an antibody; the complement fixation test was demonstrated as in typhoid itself; a decided increase in opsonins was present; Neufelt's method of estimating the power of the phagocytes showed results, after three to four weeks following injection, 1000 to 6000 times that of normal blood.

Recently Albert and Mendenhall[6] have

demonstrated an increase in the number of leucocytes immediately following an injection of vaccine; a differential count showed an increase of the polymorphonuclear neutrophiles and large mononuclears, the latter characteristic of blood in typhoid fever. Typhoid precipitins were also found markedly abundant after vaccination; agglutinins were increased; the Widal reaction was positive five to ten days after inoculation for immunization, becoming more strongly positive after the second and third doses. Major Russell[7] of the United States army found the Widal reaction positive at a dilution of 1:5000, 1:10,000, and 1:20,000, never less than 1:500 to 1:600, with a persistence of one to two years. In experiments recently upon twenty-five students at the University of Kansas, an agglutinating power of 4 to 16 was increased to 64 to 192 a few weeks following injection. The results of agglutination tests reported by P. G. Weston[8] of 898 patients in an institution were: blood taken before inoculation failed in every case to cause agglutination at 1:250. Blood taken ten days after inoculation gave the following results: positive at 1:250 dilution, 100 per cent of the cases; positive at 1:10,000 dilution, 74 tests were made, all positive. The bacteriolytic properties of the serum in 20 cases, taken at random, showed bactericidal properties at a dilution of 1:20,000.

The process of immunization through typhoid inoculation can therefore readily be compared to the process of nature in its efforts to overcome an attack of typhoid fever. The typhoid bacilli are fed into the circulation, having multiplied in the liver, kidneys, spleen, and bone-marrow; this is the stage of auto-inoculation. The bacilli undergo destruction in the blood stream by the action of the bacteriocidins and bacteriolysins; endotoxins are liberated, causing the period of high temperature and toxic symptoms. The endotoxins and other products of the metabolism of the bacteria are diluted by the whole volume of blood, and act upon the body tissues, in a form so diluted as to develop only tardily from these tissues the antibodies necessary for an immunizing response. On the other hand, when killed bacilli are injected into the tissues, the endotoxins liberated following bacteriolysis produce a local toxic effect, and the same tissues give out a rapid local production of immune bodies which find their way into the blood. In both cases the tissues receive the full toxic effect; the difference lies in the fact that in auto-inoculation the tissues develop a slow immunizing response, whereas in the injection of killed bacilli the tissues develop a rapid immunizing response.

According to Wright "our aim in inoculation is to exploit in the interest of the infected tissues the unexercised immunizing capacities of the uninfected tissues." Major Russell expresses a similar idea: "The subcutaneous tissue produces antibodies freely, and as it is not ordinarily involved in typhoid fever, subcutaneous injections of vaccine in this disease do good by throwing this unused center into action." Wassermann and Citron in 1911, as a result of their experiments upon rabbits with subcutaneous injections of killed bacilli, have also arrived at the same conclusions.

The theory then of vaccine therapy may be expressed as follows: Vaccine inoculation is that process which develops within the body tissues, when stirred to increased activity by the irritation from the vaccine or antigen, the power to produce in excess antagonistic substances or immune bodies more rapidly than occurs under the stimulation of a natural infection. The immune bodies natural to the disease and those artificially developed combine to cause improvement in symptoms, or final cure. All other measures that maintain or increase the average body resistance are likewise essential, and in no way detrimental to the effective action of the vaccine. Whether we accept the foregoing theories or not, clinical experience has convinced many of the true worth of vaccine therapy in typhoid fever by the fact that vaccine in quantities sufficient to stimulate an increased production of bacteriotropic sub-

stances can be injected subcutaneously into typhoid patients without aggravating their toxic condition. This fact alone, obtained by clinical research and confirmed by an increasing number of workers, stands out as the chief point in the whole question as to the practical application of this method of therapy.

With a knowledge already gained of the mechanism of infection and the process of immunization, naturally or artificially induced, little as it may be judged in the light of a more complete truth, we can nevertheless claim for vaccine therapy in typhoid fever that it is not a treatment based on speculation, but one founded on information and knowledge gained by known methods of clinical research.

Effects.—Chantemessé[9] from 1901 to 1907 collected 1000 cases which he had treated with antityphoid serum; his mortality was 4.3 per cent, reduced from 17 per cent.

The results of 290 cases of three other physicians was 4.16 per cent. Upon a return to the former treatment without serum the mortality rose to the previous height.

The average mortality of cases treated in other hospitals for the same period of years was 10 to 12 per cent. Chantemessé reported an initial rise in temperature upon inoculation, with a quick fall, the pulse slowed, the urine increased in quantity, complications rare.

The incidence of intestinal perforation was not diminished to such an extent as other serious complications. It is now generally accepted that Chantemessé's serum acted rather as a typhoid vaccine, owing to the probability that it contains the bacterial elements originally injected into the horse supplying the serum. Under any circumstances the results were excellent.

Sadler[10] in 1911 reported 50 cases treated in 1910 with vaccine—mortality of 18 per cent. Five of the nine cases ending fatally were considered hopeless at time of first inoculation. Forty cases treated in 1911 with vaccine resulted in a mortality of 12.5 per cent. His conclusions were that vaccine therapy shortens the course, modifies the severity of the disease, makes mild cases of average ones, and modifies severe cases into those of average severity. Only very severe toxic cases, he declares, failed to show improvement in the treatment. The dose was 1,000,000 to 4,000,000 killed bacilli by subcutaneous injection every four to five days until tenth day of normal temperature, to remove the danger of anaphylaxis should relapses occur. This dosage, considered from present knowledge, is far too small.

Contraindications to the Use of Vaccine: No injection within twenty-four hours after hemorrhage, never in suspected perforation. Within twenty-four hours after injection Sadler's patients felt better and even hungry. He states the average dose among other investigators was 300,000,000 killed typhoid bacilli.

Sir David Semple,[11] another associate with Wright in the immunization work for the British government, reported 435 collected cases and 60 cases that came under his own observation. The mortality rate for collected cases was 3.6 per cent; relapses 4.7 per cent; Semple's fatality was 3.3 per cent and relapses 3.3 per cent. He reports the following effects of treatment: In but few exceptions the temperature course was lowered, but not cut short to any appreciable extent; in none did complications or sequelæ give rise to any trouble; in no single instance of 15 cases in which the opsonic index was taken could any lowering of opsonins be detected, and no clinical evidence of a negative phase in his 60 cases demonstrable. In two control cases the opsonic index was below the normal in both. In one of the fatal cases the blood showed a negative phase before death. Dosage 100,000,000 for the initial dose up to 300,000,000, with interval of twenty-four to forty-eight hours, depending upon the rapidity of the response to the injection. The larger the dose the longer the interval, the smaller the dose the shorter or even daily interval. In regard to dosage

the object is to increase the protective substances in the blood as quickly as possible without adding to the toxic condition of the patient. There is no definite rule of dosage: the difference in various strains, the difference in immunizing response of different patients to the same dosage, and the difference in response in cases of different severity must always be taken into account. The ideal dosage is to give often and large enough to maintain a bacteriotropic pressure. Semple sterilizes typhoid and other vaccines by the addition of 0.5 per cent phenol without heating; he finds the immunizing and keeping properties of vaccine are more reliable when heat is omitted. His advice to those working for good results in vaccine therapy in typhoid fever is: Watch the blood changes and clinical symptoms and the response to earlier doses; take an occasional blood test for the bactericidal power of the serum. The opsonic index and increase in agglutinins would be sufficient for all practical purposes to indicate whether the vaccine is helping in what nature is trying to accomplish. Continuation of the treatment for a short time during convalescence has more effect in preventing relapses, and also has some effect in the prevention of typhoid carriers.

Phalen in 1912 reported 400 collected cases. The effects of vaccine therapy showed that it shortens the fever period and the total duration of the disease; markedly reduces complications and relapses. The average mortality was 4.9 per cent. Though there was no improvement in some cases, no harm was done in the 400 reported cases. In but few instances was there an increase in temperature and no aggravation of the disease. In the earlier cases the dose ranged from 10,000,000 to 100,000,000 killed bacilli; the dose ranges at the present time from 100,000,000 to 500,000,000.

Watters[12] of the Boston University School of Medicine, following a request by him in one of the medical journals for reports from other workers of typhoid cases treated by vaccines, has collected several hundred cases; and an early report not only of these collected cases, but many of his own, is promised. Watters and Eaton in 1908 reporded 36 cases. Watters concludes that in typhoid vaccines we possess an additional means of combating the disease; that they will in a long series of cases shorten the fever, lessen the severity of the infection, decrease the intensity of the symptoms, and reduce the total mortality. There was no aggravation or injury of any kind demonstrable following their use. The more serious the cases, the smaller the doses used.

Sir William Leishman,[13] an associate with Wright in his pioneer work in vaccine immunization, states that typhoid vaccine as a therapeutic means shows continued promise of good, but that an estimation of the protective substances in the blood was necessary to prove the theories well founded. In reporting his cases the following results were obtained: The enteric facies disappeared, the patients said they felt better, and in two or three cases they even asked that the vaccine should be repeated. Also it seems to reduce the size of the spleen and to increase the flow of urine. Shortening of the fever is difficult to judge. As to the temperature, the result of vaccination is to raise this in the following twenty-four hours about 1° F. over what might have been expected, but it soon falls to a point one degree lower than before inoculation. About the third day after inoculation it tends to rise again; another injection is given and the same result follows. Finally the temperature touches normal and remains there. As to the relative advantages of using a stock vaccine or an autogenous vaccine, Leishman thinks a stock vaccine appears insufficient, and as far as our present knowledge goes he would recommend starting at a dose of 50,000,000 and cautiously increase to 100,000,000 to 150,000,000. In his opinion the vaccine treatment of enteric fever is sound practice and will grow in favor as time goes on.

Stone, Russell, Currie,[14] Ravenel,[15] and

Meakin have reported success in the treatment of typhoid carriers by the use of typhoid vaccines; Johnston,[16] and also Uhlenhuth,[17] in their experiments upon rabbits have produced a condition analogous to the typhoid carrier stage in man, and the former reports successful treatment with typhoid vaccine. The above workers claim that vaccination certainly seems indicated as a means of treatment of typhoid carriers and also as a prophylactic agent in the prevention of such carriers. A routine examination of stools and urine of all typhoid fever convalescents should be required by all municipal health authorities until successive cultures are negative, as is at present the practice with cases of diphtheria. These regulations are maintained in regard to typhoid fever in southern Germany and in other European countries. It is now realized that the typhoid morbidity rate found in cities where water and milk supply have been brought up to a high standard of purity is maintained almost entirely by temporary and chronic carriers.

Conradi,[18] a German investigator, states that 5 per cent of typhoid patients are chronic carriers. Park[19] thinks that 2 per cent of all typhoid cases become chronic carriers. In Gould and Qualls'[20] collected cases 20.6 per cent of the 9256 convalescents were carriers, the bacilli being excreted from the gall-bladder, salivary glands, and prostate.

What a distinct and added value would pertain to this method of treatment if further results proved that typhoid vaccine has specific virtue in the treatment and prevention of typhoid carriers.

The privilege was given me by Dr. Joseph Sailer and Dr. James E. Talley of here making a report of the results obtained by them with autogenous vaccine upon typhoid cases at the Presbyterian Hospital during 1911 and 1912.

Nineteen cases treated with autogenous vaccine and 3 with stock vaccine, making 22 cases, with one death; or a mortality rate of 4.5 per cent. One case with relapse, or 4.5 per cent relapses.

Seventy-one regular cases treated during the same period: 5 deaths, 7 relapses, or a mortality rate of 7 per cent and percentage relapses 10 per cent.

The fatal case ran a long toxin course with complications, as deafness, phlebitis, relapses, and repeated hemorrhage, until the forty-ninth day of the disease, when 10,000,000 killed bacilli were injected. The patient was still sinking when on the fifty-third day, after a four days' interval, 15,000,000 killed bacilli were given. Perforation was diagnosed, and patient died on the fifty-fourth day of illness.

A detailed report of the 19 cases treated with autogenous vaccine follows:

Age ranges from 11 to 35 years. Sex: 12 female, 7 male. Dosage: 10,000,000 for initial dose to 800,000,000 maximum dose, with an average dose of 200,000,000.

In 3 children from 50,000,000 to 400,000,000 killed bacilli were injected.

Number and frequency of doses: From 1 to 11 doses. Interval: From 24 hours to 7 days, or average of 3 days. Duration of fever at first dose: 7 cases from 10th to 18th day; 6 cases from 20th to 25th day; 6 cases from 32d to 51st day.

The total duration of fever: the 7 cases above averaged 30 days; the first 6 cases above averaged 26 days; the latter 6 cases above averaged 50 days.

Relapses were present in three cases, previous to vaccine inoculation; present in one case following vaccine inoculation. Hemorrhage in four cases—in two during the course of vaccine inoculation; in two both before and after inoculation. Toxin condition present in four cases previous to and with rapid moderation following inoculation. Delirium present in two cases before vaccination.

Temperature changes: In six cases no immediate change of temperature. In seven cases there was an initial rise and a gradual fall to normal. Three cases showed a high initial rise and a rapid fall to normal. Three cases showed a gradual constant fall after administration.

The temperature picture, except for the

first six cases cited above, changed to a large remissive type and a lowered temperature course. Reaction: Other clinical symptoms following the injections were mild in every case; the symptoms, besides a local area of redness at site of injection, were those of a beginning cold, malaise, and slight headache, with disappearance in twenty-four hours.

Complications: Otitis media, and bronchitis in one case; mastitis in one case; abscess and furuncle in one case.

Urine output increased in 10 cases following the administration of vaccine, showing an improvement in the toxic condition of the patients. This result was not seen in cases in which the initial dose was small. Occult blood was present in five cases.

Special auxiliary treatment: Hypodermoclysis in four cases.

The general condition in every case, except one, was improved following inoculation. Complications present previous to injections, except in two cases, disappeared after the administration of vaccine. One case continued to have relapses after five injections, and only ceased after a high caloric diet was instituted.

COMPARATIVE TABLE.

	With vaccine.	*Without vaccine.*
Mortality rate.	4.5 per cent.	7 per cent.
Relapses	4.5 per cent.	10 per cent.
Complications.	Otitis media, Neuritis, Bronchitis } 1 case.	Cystitis, 3 cases.
		Abscesses Uterine hemorrhage
	Mastitis, 1 case.	Ulcerative mastitis
	Abscess, Furuncle } 1 case.	Enuresis, 2 cases.
		Parotiditis
		Bronchitis
		Pleurisy
		Ileocolitis
		Hematemesis
		7 cases.
	Delirium, 2 cases.	Delirium

Results: Mortality rate lowered. Relapses and complications lessened. Toxic condition and delirium diminished. Urine output increased. Temperature, except in 27 per cent of the cases, showed immediate lowering and a continued lower course. No effect on the average duration of fever resulted from this method of therapy. Complications were mild and with no sequelæ. General condition improved.

Autogenous vaccine is naturally the proper vaccine and the most scientific method of vaccine administration. Its two possible impractical features are: First, delay in inoculation, dependent upon a positive blood culture and the preparation of the vaccine; second, its expense to the patients, in general practice. It is also not always available or readily obtainable by physicians without hospital or laboratory facilities.

Investigators unite in advising the use of a reliable stock vaccine until an autogenous vaccine is made ready for use. The sooner the vaccine is given the shorter the duration of fever has been found to be and the milder the attack.

The Preparation of Vaccine.—The vaccine used in these cases was prepared by Wright's method of standardization: A suspension of killed typhoid bacilli in physiological salt solution, sterilized at 58° to 60° C. for one hour; then a test is made for sterility before the solution is placed in ampoules.

Two methods of early diagnosis have been successfully used: One, the ophthalmic reaction for typhoid fever, first described by Chantemessé and similar in principle to Calmette's ophthalmic reaction for tuberculosis. Austrian,[21] who has applied the test, used cultures of eighty different strains of the bacillus typhosus. This test promises to be an early available reaction for diagnosis. The other test is the skin reaction test of Pendergast,[22] following the intradermal injection of 5,000,000 killed bacteria. This injection shows in the non-typhoid patient an area of well-defined redness at point of injection twenty-four hours after ioculation, disappearing in equal time. The true typhoid case gives no reaction to this test. The injection must be given as superficially as possible, to obtain uniform results.

Sites for Injection in Vaccine Administration.—First, a few inches below the clavicles well into the subcutaneous tissues; then in the flanks and sides of abdomen and arms. No two injections in the same spot, in order not to overtax the tissues and also to favor a larger output of pro-

tective substances. As in every method of treatment, failures and successes run hand in hand; before condemning this form of therapy it is often well to see if the fault does not lie in the individual using the vaccine rather than in the method itself. When failure results, four causes, according to Emery,[23] must be considered: (1) The improper selection of vaccines. (2) The improper preparation thereof. (3) Incorrect doses. (4) Unsuitable doses.

The dosage must be quickly increased until the maximum immunizing response is produced; intervals short between small doses; long intervals between large doses.

Blood changes and degree of clinical symptoms must be studied; the age of patient and severity of disease must also be considered in the size and frequency of the dose.

The Time for Injection.—It is best given in the late afternoon, about 4 P.M. Even in severe cases the administration of small initial doses, as low as 2,000,000 every twenty-four hours, does not increase the toxemia and often improves the condition. The response to an initial dose cannot be determined in advance of injection. If the clinical reaction is characterized by malaise, rise in temperature, aggravation of local symptoms, or headache following an initial dose, the second injection should be smaller; then gradually increase until temperature has reached normal and continue until the tenth day of normal temperature, to prevent relapses and anaphylaxis, should injection again be necessary, and also at times the prevention of typhoid carriers.

As vaccine prophylaxis against typhoid fever is, according to Russell, borne well by children and by women, so in treatment the same results obtain. Doses are determined by the body weight, 150 pounds being the unit. Treatment with vaccines should be conservative at or near time of menstrual period.

There are two important methods of vaccine administration in immunization and therapy, namely: one in which killed bacilli are employed; the other in which living sensitized or sensibilized bacilli are used. In the first method the bacteria are killed by heat, a temperature of 53° C. giving the best results, according to Russell and Chantemessé. Sterilization is preferred by Vincent[24] in France, who uses a polyvalent vaccine resulting from a mixture of several strains, indigenous to the country where the vaccine is used. Semple uses a .5 to 1.0 per cent phenol for sterilization. Both Russell and Chantemessé consider the use of living sensitized bacilli as dangerous, but in Metchnikoff and Besredka's[25] report of more than 800 cases of immunization no death was reported and not a single carrier observed.

The method of administration with living sensibilized bacteria was introduced by Metchnikoff and Besredka in 1911. This vaccine contains the living germs of typhoid, weakened, sensitized, or attenuated by antiserum from the horse. Various other ways have been used by other workers to cause sensitization, whereby the living germs are unable to grow or produce the real disease.

Broughton Alcock[26] reported 750 cases vaccinated by this method, besides the 800 cases reported by Metchnikoff and Besredka. His conclusions are as follows: The successful experiments upon man by the method of Besredka have taken us one step forward in the application of vaccination. Cannot the living sensibilized bacillus typhosus be considered in the same light as the virus of smallpox, attenuated or modified by the immunized calf lymph, which gives rise to a specific immunity, that may virtually be called ideal? Vaccination by living microörganisms has been proved most effective by experiments upon chimpanzees by Metchnikoff and Besredka, in which killed cultures failed to protect against experimental infection; while vaccination with sensitized cultures afforded complete protection. Observations on man have proved the innocuousness of the sensitized bacilli, and he presumes to conclude this method ought by preference to apply to man.

This method seems to give satisfactory results, but it has not been largely used in immunization or therapy, as it is not known whether it is safe as a sterile vaccine of killed germs.

A third method of vaccine administration is a preparation obtained by partly dissolving the typhoid bacilli in normal salt solution and using the clear filtrate containing the endotoxins. This method is not considered as safe as the other two methods. The effect of the filtrate may be only toxic and with no immunizing power, as the endotoxins alone do not excite the production of immune bodies.

Citron,[27] a noted German bacteriologist, has this to say of the first two methods: "All immunizing investigations of recent years have shown even more clearly that any one trying to immunize and cure with dead bacilli was on the wrong track. We were led into it because antibodies of the most widely differing source can be created from dead bacilli and are of considerable importance for diagnosis. For prophylaxis and therapy, on the other hand, one can only consider the unchanged virus, generally speaking, if one wishes to have real results. All the great results of immunizing research, such as those obtained by Jenner and Pasteur, were obtained with living virus, with Pasteur vaccine, not with Wright vaccine, which contains dead bacillic material. The fact that killed bacilli prepared in Europe have been sterilized at such high temperatures explains the poor results obtained there by this method of administration. Major Russell of the United States army obtains better results in the immunization against typhoid fever with killed bacilli than against smallpox with living vaccine. He states that our present knowledge of the methods of immunization will never bring about perfect immunity either in typhoid fever or smallpox."

According to Smith, sensitized bacilli are no more efficacious than bacilli killed with low temperature, unless possibly there may be some very labile substance present, but so far not discovered, that is affected by low temperature. A vaccine giving the best results would seem to demand the following requisites: (1) As little change as possible in the living virus. (2) An autogenous vaccine. (3) Inclusive strains containing typhoid and paratyphoid strains, where an autogenous vaccine is not obtainable.

A non-living typhoid vaccine or antigen contains all the necessary constituents of the typhoid bacillus when sterilized at a temperature of not less than 53° C. and not more than 60° C. Uniformity of action has been shown in producing a full and ample degree of immunity so far as this can be demonstrated. After the administration of one or more full doses of this vaccine all the specific antibodies can in every case be demonstrated.

Chantemessé of Paris, in a communication to the Academy of Science, in January last, predicts that typhoid fever will gradually disappear during the present century, just as smallpox was brought under control in the nineteenth century.

With a more general application of typhoid vaccines both in prophylaxis and treatment, and, of far greater importance, a nation-wide uniformity of and coöperation in sanitary methods of sewage disposal and of water and milk supply, we can hope for the not far distant future that typhoid fever will no longer be tolerated in a civilized community.

The cases so far reported may seem too few to definitely prove by this method of therapy the extent of its worth, as one giving better results than other therapeutic measures; but in the light of results already obtained physicians should not feel justified in withholding this treatment, but should be encouraged to make a more extensive trial of this auxiliary to other therapeutic means, with the hope that in it they have an agent which will reduce typhoid mortality, lessen relapses, and modify the severity of the disease.

CONCLUSIONS.

1. The excessive increase in immune bodies or protective substances found in the blood of patients undergoing treatment with typhoid vaccine affords a sound basis on which the principles of vaccine therapy rest.

2. The negative phase, or increased susceptibility following vaccine inoculation, except in excessive doses, has been proved not to be a factor in typhoid vaccine therapy.

3. The fact that vaccines in quantities sufficient to stimulate an increased production of immune bodies can be injected subcutaneously into typhoid patients without aggravating their toxic condition is another strong basis founded on clinical experience.

4. This method is without danger when administered by those with a technical knowledge of immunology and the facilities of studying the amount of protective substances in the blood. The measure of the bactericidal power of the blood should be estimated in addition to the agglutination test, in basing properly one's knowledge of the efficacy of this therapeutic means.

5. Autogenous vaccine is the proper and most scientific method of vaccine administration. A good stock vaccine of single or inclusive strains should be used as soon as possible after diagnosis, until an autogenous vaccine is obtained. The sooner the injection, the shorter the duration of fever and the milder the attack has been found to be.

6. In putting vaccine therapy to the test it is best to take a middle ground between radicalism and empiricism on the one hand, and conservatism and purely scientific endeavor on the other.

7. The results so far obtained tend to show that vaccine therapy in proper hands lowers the death-rate, diminishes relapses, lessens complications, and has proven to be of value in the treatment of typhoid carriers.

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135 MONTGOMERY AVENUE.

DESCRIPTION OF AN APPARATUS FOR APPLYING EXTENSION OR TRACTION IN THE OPEN TREATMENT OF FRACTURES OF THE LONG BONES, AND ALSO AN APPARATUS FOR RAISING PATIENTS AND FACILITATING THE APPLICATION OF PLASTER CASINGS.

BY E. L. ELIASON, A.B., M.D.,

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While associated with Dr. Edward Martin in his open treatment of fractures of the long bones, especially the femur, at the University of Pennsylvania Hospital, the idea occurred that a better means of extension or traction of the lower fragment was needed.

Up to that time extension to overcome the overriding was accomplished either by an assistant pulling on the extremity or by applying weights over a pulley.

The Martin traction strap over the upper end of the lower fragment was and still is used. It consists of several thicknesses of drilling sewed together into a strap about two inches wide. Into each end is sewed a loop. The upper end of the lower fragment is angled out of the wound, the center of the "traction strap" sterilized and applied over it, and the weights attached by means of a rope to the two ends after being carried over a pulley. Appreciating the advantages of straight direct purchase on the end of the lower fragment by the traction strap over that of exerting it through muscles, joints, and other soft parts, causing more or less trauma, endeavor was made to perfect the means of acquiring the force, as the lifting of heavy weights is rather cumbersome and laborious, especially for a nurse, to whom the duty usually falls. The idea was to get an apparatus that, used with the Martin traction strap, would accomplish extension with the least labor and trouble. Further, to be practical and generally useful it must be adaptable to all operating tables, and from a point of interest, if for nothing else, should indicate the amount of pull being exerted at any time. With these ideas in view the following apparatus was devised:

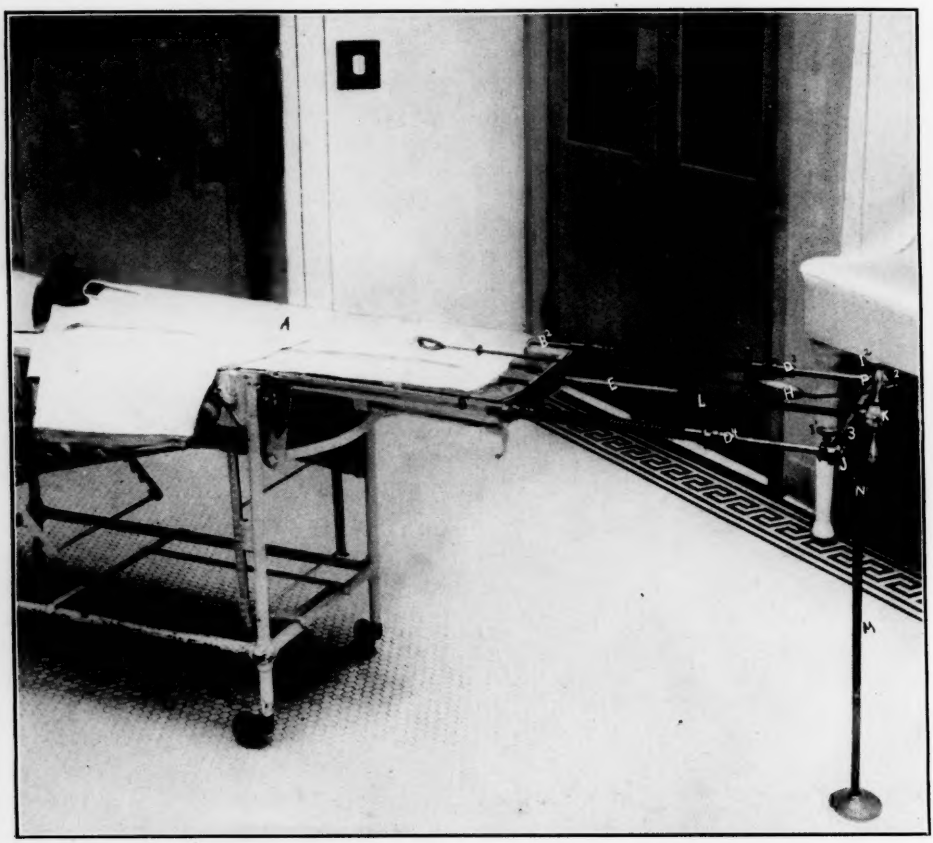
It consists of two steel rods ⅝ inch in diameter and 4 feet long, with short posts at one end to fit in the stirrup sockets on the table. Crossing between these bars are three steel pieces ⅜ inch thick and 1½ inches wide, with slots cut in the ends into which fit brass bushings, which in turn slide on the long steel side bars. The slots enable the side rods to be spread to fit wider tables. Into the center of the crosspiece nearest the table is fixed a third bar, which extends out to just midway between the ends of the side rods. This rod is threaded for the reception of a pilot wheel. The second crosspiece has a hole in its center through which the threaded rod passes freely. Between these two crosspieces and also encircling each side bar or rod is a steel spring so patterned that it takes 220 pounds to compress it. Attached to the second crosspiece is a scale graduated from zero to 220 pounds and pointing toward crosspiece No. 1. With the two crossbars snug against the springs the zero lies opposite a mark on the center threaded bar. As the springs are compressed the force causing it is indicated in pounds on this scale. Also attached to this center crosspiece is an upright brass piece, with a hole in it for the accommodation of a brass cable. On one end of the cable is a hook, and on the other end is a thumb-screw and clamp to prevent the cable from slipping through when strain is brought upon it. The hook grasps the loops in the traction strap. The third crosspiece also has a central hole for the accommodation of the center rod. The pilot wheel next comes on the threaded bar, just beyond the last crossbar.

To enable the fixing of the outer ends of

the side bars to correspond with the width between the other ends, a brass collar with a slotted screw-hole encompasses the bushing. After the correct width is obtained, the screw is tightened down and the apparatus frame is solid. By reason of this little adjuster the apparatus can be made to fit any table with stirrup sockets anywhere weight of the apparatus and make it more steady.

For storing, the tractor can be taken apart, as each bushing and where it goes are stamped with corresponding numbers.

Method of Using the Tractor.—Set up the machine on the operating table and adjust it to slide smoothly before putting the

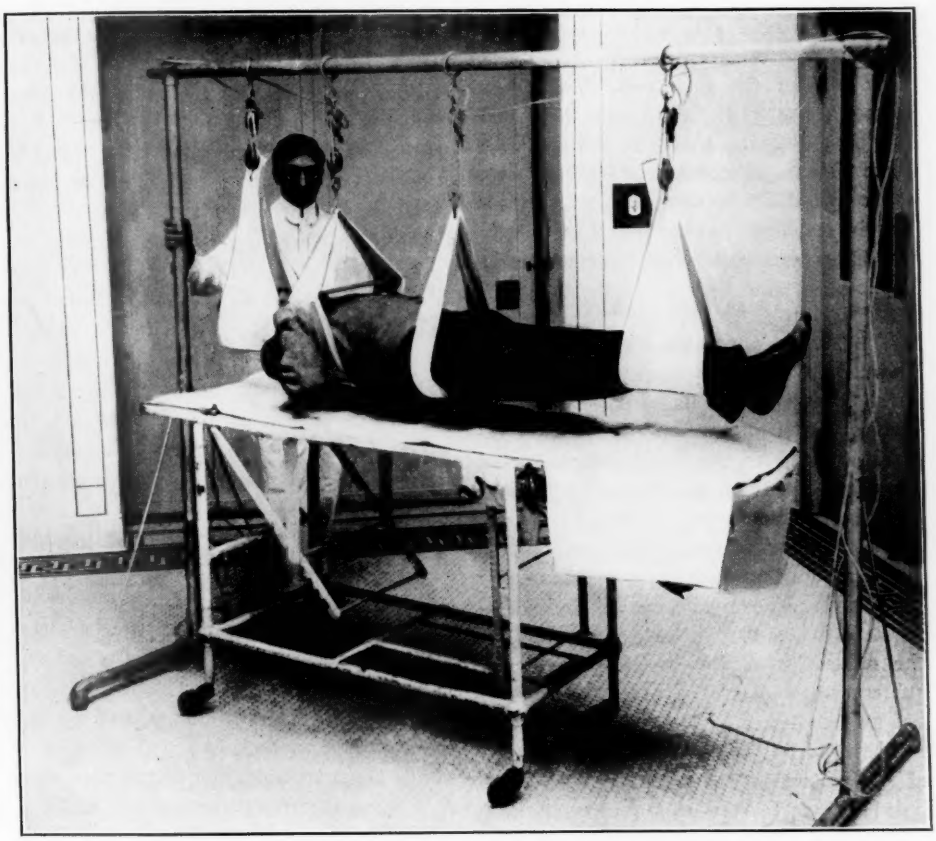


Eliason Tractor.—A, Martin traction strap; B, 1, 2, side bars; C, brass cable; D, 1, 2, 3, 4, brass bushings freely movable on side bars; E, center traction bar attached to cross-bar No. 1 passing through Nos. 2 and 3 and threaded for pilot wheel K; F, 1, 2, springs requiring 220 pounds to compress; G, brass upright with hole to accommodate cable; H, clamp for cable; I, 1, 2, thumb-screw for fixing bushings P, 1, 2; J, 1, 2, brass keepers with slotted screw-holes; K, pilot wheel; L, brass scale; M, brass upright; N, adjusting screw.

from 19 inches to 22 inches apart. By using different length traction straps, and shifting the clamp up or down on the 3-foot cable, extension can be applied to either the upper or lower extremity of any patient. Fitted under the center of the third crosspiece is an upright, adjustable by means of a screw and thread to support the patient on the table. The side bars must be parallel and also horizontal. After adjustment the extension may be lifted off the table, by unscrewing the stirrup sockets, and laid aside until required. The patient is placed on the table and two perineal padded canvas straps are passed under the perineum, the ends carried out over the

upper part of each thigh and fastened to the sides of the table. In upper extremity cases the straps pass under the axilla and fasten to the head of the table. These straps give counter-traction and prevent the patient being pulled along the table.

The tractor is now lifted into the stirrup sockets and screwed tight. The support is then applied under the last cross-bar. The pilot wheel is unscrewed until the first cross-bar is back against the foot of the table and the zero of the scale on the second cross-bar is opposite its starting mark on the center rod. The cable is now hooked in the looped ends of the traction strap, which has been applied over the end of the lower fragment. By means of the clamp and thumb-screw on the cable, all slack can be taken up and the extension acts against a taut cable. The pilot wheel is screwed down, the cross-bar No. 1 compresses the springs against cross-bar No. 2, to which is attached the traction strap over the upper end of the lower fragment. The fragment is now steadied by an assistant. By successive turns of the wheel any degree of pull from zero to 220 pounds can be brought to bear upon the fragment. At all times the scale will indicate just how many pounds pull is being exerted upon the bone. As the muscles stretch and the fragment pulls down the scale indicates the same by registering a lessened amount of pull. When sufficient extension has been exerted, the pilot wheel is turned back until the springs expand and the scale will again register at zero. The traction strap is removed from over the bone. The stirrup



Martin-Eliason sling

screws are now loosened and the apparatus lifted from the table as one piece.

A separate set of springs has been made requiring 400 pounds to compress them, which, of course, means that a traction of 400 pounds could be exerted upon the bone. The apparatus permits of pulling or extending the lower fragment approximately 6 inches, a stretch that the soft tissues of the limb would not permit without severe injury. It is readily seen that means other than the traction straps may be used on the hook end of the cable. A shoe-top extension or hooks to fasten over the end of the bone may be used, as advocated by some writers. By making use of the shoe-top or padded-spat method, the apparatus may be employed to extend and hold in position the fragments while a plaster cast is applied.

APPARATUS NO. 2.

This second apparatus, suggested by Dr. Edward Martin, was devised to facilitate the holding and moving of patients during and after the application of a plaster-of-Paris dressing of the lower extremity and the pelvis. There is good reason to believe that many plated, wired, or nailed fractures have had their integrity destroyed at the time of the primary dressing or before the cast was hardened. This can be readily understood when the numerous instances of the difficulties of the dressing stool and subsequent transference of the patient to bed are recalled.

The following device is meant to render all this unnecessary:

It is made of 1½-inch galvanized iron tubing, consisting of two uprights, 6 feet high, with side stays and rubber-shod feet, three feet wide, connected by a horizontal bar of 1½-inch galvanized tubing, 7 feet 6 inches long, passing through "T" joints on the uprights or standards. Thumb-screws tighten these connections. The standards can be moved to any position on the horizontal bar, provided the thumb-screws are loosened. Encircling the bar are four rings that can be moved freely along the bar. Attached to the rings are four sets of double blocks reeved with ⅜-inch window rope. Each of the eight blocks is armed with a hook. To support the patient four slings of canvas are made, one each for the head, chest, pelvis, and lower extremities. Three of these are eight inches broad in the center and four feet long, tapering toward each end. The fourth is only three inches broad, tapering toward each end. The ends are all reënforced with two thicknesses of canvas and have four buttonholes, two at each end, and two 6 inches farther up the sling. One of the three broad slings, used around the chest, is furnished with a spreader of light wood, to prevent compression of the chest, and with side pockets for the patient's arms.

Method of Using.—Before placing the patient on the operating table, the four slings are laid across the table, a broad one under the head, the one with the pockets under the chest, the narrow one under the pelvis, and a broad one under the sound leg. The patient is now placed on the table. After the operation is completed, and the wound protected by dressing, the lifting frame is placed over the table and the ends of the four slings hooked through the buttonholes on to the lower blocks. The spreader is placed in position in the chest sling across the front of the chest, and the patient's arms placed through the two pockets. Two persons stand beside the patient on the side of the uninjured leg and grasp a rope in each hand. The operator or his assistant holds the plated extremity. At a word all three persons gently raise the patient, keeping the plated extremity in its same relative position. Now one of the persons at the ropes holds three ropes while the other person ties one. Then he ties his second, and then a third, until all are tied. The operating table can now be pushed out from under the patient, and the dressing and plaster of Paris applied directly over and around the narrow pelvic sling. After the plaster has hardened sufficiently, the patient's bed is run under him and he is slowly lowered to the mattress. The three

broad slings are removed and the narrow pelvic either pulled out or cut off short, and left under the cast.

The frame can be put to many other uses in hospital work, such as lifting heavy bed patients from one bed to another. It can also be used for swinging fractured lower extremities and as a support for the pulley in extension cases.

In conclusion, I wish to thank Drs. Edward Martin and J. B. Carnett for many valuable suggestions.

CONGENITAL PYLORIC STENOSIS, WITH REPORT OF FOUR PATIENTS OPERATED UPON, TWO OF WHOM WERE INFANTS OF THE SAME PARENTS.[1]

BY LEVI JAY HAMMOND, PHILADELPHIA,
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Wide-spread interest in congenital pyloric stenosis appears to have dated its origin from about 1888, and has held a conspicuous place in the literature dealing with impaired gastrointestinal drainage with increasing interest to the present time. As to the frequency of its occurrence, there seems to be no controversy between the pediatrist and the surgeon, though there still exists a reasonable difference as to the wisdom of placing all degrees of stenosis in the surgical category.

Congenital stenosis in a given number of cases may be accounted for through vicious development in either the organ itself or defect in the development of some of the organs with which it shares in the process of formation, such, for example, as the liver—the formation of both being from the right primary foregut. The defect may occur as an inverse twisting or a reverse growth of the longitudinal or circular fibers, or both. It seems entirely possible for the rather intricate anatomical arrangement of this organ to meet with disaster in its embryologic development either in defect of structure alone or by faulty position in which it may be placed by the liver, which is claimed by some biologists to influence the pyloric development through a shortening or twisting of the primary foregut; this influence by the rudimentary liver acting much in the same manner as situs inversus viscerum is supposed to develop. In support of this theory it is not uncommon to meet such coexisting lesions as hernia, dilatation of the colon, cardiovascular diseases, and supernumerary organs. In none of the patients upon whom I have operated has there been visceral transposition.

Anatomically the pylorus is formed by a reduplication of mucous membrane from the stomach intermixed with muscular fibers having a definite function of dilatation and contraction; the muscular fibers are aggregated into a thick circular ring, the longitudinal fibers and serous membrane taking no part in the formation of the ring, though they pass directly over it. The orifice differs very greatly in shape—it is occasionally oval, sometimes a circular fold is replaced by a crescentic one, placed one above, the other below, the orifice; more rarely there is but one crescentic fold. Indeed, there is no organ in the body the position and shape of which presents more frequent alterations, and hence possibilities of anomalous changes, than the pylorus.

The pathogenesis of pyloric stenosis still lends itself largely to a theoretical discussion. It seems, however, that from an embryologic and anatomical view-point the problem must involve a consideration of those factors entering into defect in development of the tissues. There are various additional theories of causation: for instance, H. I. Nicoll says it may be the result of a primary congenital developmental aberration possibly connected with the junction at the pylorus of two different processes of development; or that it may be the result of congenital hypertrophy of the muscular walls of the pylorus secondary to

[1] Read before the Philadelphia Pediatric Society, June 10, 1913.

antagonistic and incoördinate action of the stomach on the one hand and the walls of the pylorus on the other; or that it may be dependent on functional disorder of the gastric nervous system; or it may be the result of spasmodic contraction arising from gastric irritation after birth alone, and therefore not congenital; or lastly, that the condition may be the result of a chronic inflammatory process. I take it that neither of the last two theories of causation could for a moment be assigned by those who have had an opportunity to study the actual pathology as found on the operating table or microscopically.

As a rule the babies are plump and well formed at birth. More than half of the recorded cases have been breast-fed. The earliest symptom is vomiting, beginning soon after birth, or it may be delayed several weeks, the first amounting to nothing more than simple regurgitation after feeding, which later becomes persistent and unyielding to all remedies. As the time goes along and dilatation of the stomach increases the vomiting may be delayed until two or more feedings, when the entire quantity will be expelled. It is projectile in type and not believed to be accompanied by nausea. The ejected food, if it has remained in the stomach for a time, will be partly digested, which is proof that the digestive power of the stomach is not at fault. If the occlusion is not complete, there may be some bile staining of the vomitus. The epigastrium becomes prominent, due to the dilated stomach, while the hypogastrium is sunken (scaphoid) because of the empty intestines. If occlusion is not complete scanty stools will be passed occasionally; when complete, the stools will consist mainly of bile-stained mucus. After feeding the peristaltic wave of the contracting stomach through the thin abdominal wall can be plainly observed rolling from cardia to pylorus. At times the tumor can be felt in the region of the pylorus, though more often the liver, which is invariably enlarged to once or twice its natural size, so covers it over as to prevent its being palpated. In two of my cases the tumor could certainly not be felt, in one doubtfully; in the fourth it was distinctly felt. The peristaltic wave was typical in all. The other symptoms are those naturally to be expected, and incident to persistent vomiting, such as loss of flesh, progressive emaciation, exhaustion, subnormal temperature, and the classic picture of marasmus.

That functional spasm plays a considerable rôle in the production of mere symptoms cannot be doubted. The alternating improvement and relapses commonly seen would indicate it, as would also the cases believed to be cured by medical treatment. The types, from a diagnostic standpoint, may be grouped into three classes: first, those in which hypertrophy in a marked degree exists with but little, if any, spasm; second, those in which a moderate degree of hypertrophy is present with spasm as the major factor in the occlusion; third, an intermediate class where neither hypertrophy nor spasm is intense. Even with greatly thickened walls there is not of necessity complete obstruction; indeed, this is rare. The degree of hypertrophy and the degree of spasm vary widely in different patients. Patients in whom the signs and symptoms were typical of pyloric obstruction, who recovered under purely medical treatment, it is logical to suppose were those in whom spasm had been the most prominent element, and the degree of hypertrophy moderate. It is, however, inconsistent with our knowledge of the function of the pylorus to suppose that any degree of hypertrophy, even though it be minor, could here exist without causing symptoms of impaired gastric drainage. By some it is a question whether these cases are true congenital or hypertrophic, secondary to spasm, the latter being thought to be postnatal from irritating food or hyperacid secretion. The demonstrable existence of symptoms so soon after birth in a healthy breast-fed infant would seem to discourage such a belief, and there surely must be but few who believe that an infant nursing from the breast of a healthy mother could supply the stomach with sufficient irritation from

the food taken to produce symptomatic spasm. Especially is such a belief difficult to maintain when the operating table can demonstrate the existence of such definite pathology. It is conceivable that functional spasm might occur in adults from long-continued indiscretion in diet which so alters the normal gastric secretion as to produce irritation, but even in such instances I am disposed to the belief that some degree of hypertrophy is present and actually the underlying cause of spasm.

The differential diagnosis must be made from simple recurrent vomiting due to either improper or overfeeding, from extrinsic causes, such as tumor in neighboring tissues, as a retroperitoneal growth, and from visceral adhesions. It is claimed by some that the presence of acetone and diacetic acid in the urine is a point of differential value, distinguishing cases of simple recurrent vomiting from pyloric spasm. In some cases differentiation cannot be made unless it be in the lesser severity of the symptoms, less rapid and less progressive loss of weight, which would be expected were the obstruction away from the pylorus, and not complete. When spasm is the major factor in the obstruction, marked improvement with sudden relapses should be the most classic differential point.

A definite tumor is always demonstrable, consisting of a circular indurated growth, occupying the entire circumference of the pyloric site, in some instances; it is more or less cylindrical in shape and extending well into the first portion of the duodenum. Its serous surface is smooth, and usually not adherent to the neighboring tissues. Microscopic study shows a great increase in thickness of both the circular and longitudinal fibers, the greatest thickness being noted in the circular fibers. Considerable proliferation of the connective tissue is also demonstrable, the thickness in some instances amounting to two or three times that found in the pylorus of normal children of the same age. So extensive is this hypertrophied and proliferated tissue that it would be contrary to logical reasoning to assume that either developed after birth. It was present in all the patients operated by me from the forty-second to the sixtieth day of life, hence could not possibly have thus developed. Two of the little patients operated on by me were infants of the same parents, the first of whom was a male forty-two days old, and the second a female sixty days old. From the history and symptoms it is believed that total obstruction had existed in the first infant eight, in the second four, days before operation. The third infant, a female, was fifty days old, and the fourth, a female, fifty-six days old when I first saw them, and the history of total obstruction in the former of these was eight, in the latter six, days before operation. They were all emaciated to the greatest possible degree, but promptly gained weight and health after operation had established free gastric drainage.

Treatment.—As the condition is surgical from the onset I take it that medical treatment should not be employed longer than is necessary to establish diagnosis. This applies also when the cause is either persistent spasm or hypertrophy, for even though the obstruction be due alone to spasm (which is hardly conceivable) such patients die from inanition if the spasm is intense, prolonged, and frequently recurrent. There is even greater danger in cases of hypertrophy. Within a few hours after operation has established free drainage, nourishment can be taken in small quantities and increased to full feedings in three days. Surgical treatment should consist in either pylorectomy or posterior gastroenterostomy; the former is indicated where the lesion is demonstrably localized. As this is not in my experience often possible, I have always elected posterior gastroenterostomy, which I believe will meet the greater number of indications.

Early recognition of the precise nature of the condition and prompt operative treatment as indicated, before tissue-cell resistance has too greatly ebbed away, should result in recovery of at least eighty per cent of these patients.

HYGIENE OF THE OPERATING-ROOM.[1]

BY HERBERT FOX, M.D.,

Director William Pepper Laboratory of Clinical Medicine, University of Pennsylvania, Philadelphia.

The days of empiricism have been succeeded by scientific regulation and control, and asepsis has succeeded antisepsis. Asepsis must be guarded, guided and completed by a thorough consideration of all hygienic conditions. The operating-room is certainly in as great a need of hygienic regulation as the room of a sufferer from contagious disease. While in a measure hygienic principles are observed in surgical clinics by the exclusion of dirty fingers from sterile objects, this will no more control operative results than simple disinfection of typhoid stools would always eradicate an epidemic.

In a rather thorough search of the literature I find only a few articles dealing with the arrangement and construction of amphitheaters or surgical departments, and a great number about the bacteriology. While this is perhaps the most important of the subdivisions of our subject, it is by no means the only one worth considering. It has undoubtedly revolutionized the operating-room, and we can now make such an apartment, for all practical purposes, non-infective. When we shall have brought the ventilation, heating, surface covering, and the like to the same state of perfection, we shall be ready for any great new advance science has in store.

In the presentation of this subject I shall consider briefly the surgical clinic as a unit for the hospital, the operating-room itself, the personnel, and the methods to be followed in a bacteriological examination of the room, the personnel, and the conduct of an operation.

In this country more than abroad the surgical clinic is for the use of all the surgeons of the staff. While not always practicable it is for obvious reasons better to have separate operating-rooms for each division or service. In either case it should represent a compact separate or separable part of the hospital.

I shall outline an arrangement which seems to facilitate carrying out the hygienic regulations to appear below. The clinic should consist of two parallel rows of rooms ending in the operating-room with which they separately communicate, but the parallel rooms should not inter-communicate. At the side of the operating-room should be the surgeon's dressing-room and the recovery-room. The parallel sets shall consist respectively of the nurse's dressing-room, preparation-room, and sterilizing-room in one row, the reception-room and anesthetizing-room in the other. To the side of the surgeon's dressing-room and receiving rooms may be the hallway for exit from that end of the series. The other end may be entered on the patient's side or the preparation side.

Spectators may enter from a separate entrance on the far side of the rooms, to seats at the extreme far side or corner. These spectators should be so placed that they do not endanger the operation. Glass plates will form a suitable barrier, and can be erected in front of the seat. In a hospital at Naples a gallery runs around the walls, guarded by glass plates extending to the ceiling.

The general construction of operating suites offers little upon which to dwell. The joints of course must be tight, the windows and door frames flush with the wall, and all parts set with some non-porous material, or covered with non-absorbent paint, the latter being preferable as it permits of easy renewal with added advantage of fresh appearance. The rounded corners are quite the accepted thing nowadays. Plumbing should be as simple as possible and workable by the knee. The outer doors and windows should be fitted with grooved metallic window stripping. Double windows permit of temperature regulation

[1]Read before the Clinical Congress of Surgeons, Philadelphia, 1912.

better than single. This window arrangement is nearly steam and formalin proof, but should these methods of disinfection be contemplated it would be well to add waxed canvas buffers to the window and door frames.

In the arrangement of rooms as described above, door-knobs are unnecessary except at corridor entrances. If there are double-swinging doors, no handles are necessary, or at most simple, smooth, right-angular grips. It would seem better, however, to have the communicating doors of the two series of rooms of the sliding variety worked by pneumatic power and operated by a foot crank on the floor or on the wall near the floor.

The floor and walls are usually treated with mosaic and marble with paint above the wainscoating. This matter will be referred to again. The material used is of small importance so that it be impermeable and easily cleaned.

The draining of the floor should not be in the middle nor yet toward the preparation-rooms. It should rather be, in the above plan, toward the far end of the suite, under the seats or gallery, and beside it should be an outlet of the steam system, permitting disinfection of drained material.

Lighting from above and to one side is desirable, but the former is usually sufficient. Where possible, the skylight should run down to the north side. The lighting should never cause any focusing of rays upon the table. Reflected light may be arranged at will. The surface covering of the operating-room is nearly always white. I do not know why this is other than to supply a surface which does not absorb light, but I am not sure this color is desirable, as the constant strain upon the eyes of the operator cannot be beneficial. A neutral color, say of pale gray or brown, would absorb very little light.

This brings us to a consideration of what seems to me next in importance to asepsis —that is, heat and ventilation. As I understand the requirements of operating-rooms in this regard, they should have a constant slow supply of fresh air at about 75° F. and about 75 to 80 per cent relative humidity. There should at no time be any draft, but the temperature and humidity should be uniform throughout the operating unit. The influence of this will be felt by patient, surgeon, and nurse. In the first place, if the patient remain under identical atmospheric conditions from the time he enters the anesthetizing room until he shall have recovered completely from the ether, no sudden readjustment on the part of his circulation will be necessary. For this reason I have included the recovery-room at the side of the operating-room. Moreover, this uniformity would be appreciated by those who are now going from the cool dressing-room, to the warm operating-room, to the hot sterilizing-room.

The arrangement of this scheme is one of engineering. In the first place a definite course of air-flow must be established. It should flow away from the operating-room of course. In order not to interfere with this in the course of the row of rooms the steam must be forcibly conducted away from the sterilizing-room, and it can be utilized by carrying it to heat the entering air. The air should enter the operating-room near the top, preferably by electric fans; it should be passed into a chamber heated by steam from the general system, perhaps augmented as above, and filtered through wetted cotton-wool. Its admission to the room is to be guarded by some device which will spread it and avoid drafts. In order to establish the air-flow, exhaust fans can be installed at the end of a room series. Engineers can discover from the cubic contents of rooms the proper size of the inlets and fans. Notter in his hygiene indicates that at 75° F. with a rate of 2 to 3 feet per second and 80 per cent of saturation draft would not be felt. It seems probable that this degree of humidity would not be uncomfortable to surgeons and would not permit of rapid heat radiation. A higher degree of humidity would, however, be advantageous, for it would cause a slight precipitation on walls and

floors, obviating dust and delaying drying of blood and pus. Exhaust tubes near the floor are also desirable. If the above system cannot be used large inlets may be put in any convenient place if the air be warmed. If cold, Notter says air must be admitted 9 or 10 feet from the floor and directed to the ceiling, where the outlets should also be placed, but not so as to draw fresh air directly to them. If the air has been warmed outlets may be anywhere. The subject of protection of the operating suite by differing pressures may be found by consulting Ochsner's Hospital Construction, wherein he describes how the air may be drawn away from clinic departments by lowering pressures in other parts of the building. The position of the operating suite is better at the top of the building because of purer air. The practice of putting a ventilator over the operating area is only defensible when it is well protected.

The Hygiene of Conducting the Rooms.—In approaching the subject of bacteriology of the operating-room we naturally ask ourselves first how the operating-room should be made clean; secondly, how the operating-room is made dirty. I beg leave to take these up in reverse order, for the reason that material I have to present concerns a control of cleanliness. The operating-room may be made dirty chiefly by dirty feet, dirty hands, and the bacteria coming from the nasopharynx of people therein. No one untrained in surgical asepsis should enter the operating-rooms during operations or preparation for them. The surgeon should acquaint himself with the qualifications of each attendant. There should be a routine examination of the nurses and orderlies for the presence of angina, infected wounds, and the like. I think it advisable to consider the room infected at all times and to observe the methods for cleaning to appear later. Clinical and experimental evidence points to faulty technique and careless surgery as the most prolific sources of infection. A case of the former is shown in which the surgeon did a plastic operation upon the face. Washings from the inside of his gloves remained sterile. A student who merely held instruments and sponges gave a culture of *M. albus* and *M. aureus* in the washings from the inside of his gloves.

For the bacteriological control of the operating-room it is advisable to examine rigidly the solutions, tap-water, brushes, dressings, gloves, powder, and sterilizing apparatus. To this may be added culturing the hands of surgeons, assistants, and nurses. The walls, floors, and air may be tested after pus cases or when infection has occurred without good cause. The gloves if new and whole are impermeable, as shown in work done by E. A. Schumann and myself some years ago. We have lately investigated the inside of rubber gloves as they come from operations. The inner surface has been innocent of pathogenic bacteria except in the case cited above. About half of the gloves showed *B. mycoides or B. subtilis.* These organisms were also found in the powder used for drawing on the gloves. The autoclave was found to be able to kill *B. coli* and *B. subtilis* spores when these organisms were exposed in glass tubes sealed after withdrawing as much air as possible. All cultures in the operating-room control should be made aerobically and anaerobically.

The tap-water in this clinic contained 830 bacteria per cubic centimeter; no colon bacilli, but a few of the fermenting aerogenes group. These organisms while not highly pathogenic belong to a group sometimes responsible for human infections. You will notice no colon bacilli were found. Nevertheless the presence of a fermenting organism and 830 bacteria per cubic centimeter in tap-water indicates that it should not be used for hand-scrubbing before operation. Therefore sterile water is indicated for the mechanical cleansing of the hands.

If a surgeon finds his hands infected after a pus case he should refrain from operating for some days or permit his skin to be artificially sweated out in a dry-air chamber. The emptying of the sweat glands and loosening of the sebaceous se-

cretions materially reduce the number of organisms on the skin and render cleansing easier.

The teaching surgeon must wear a face mask. My blood agar plates show from Dr. Martin's mask after operating and teaching about one hour streptococci, pneumococci, diphtheria bacilli, *M. catarrhalis, Sp. linguale,* and sarcina, while the mask of his assistant, who talked very little, worn about two hours, gave streptococci, *M. catarrhalis* and *Sp. linguale.*

The question of hand and operation site disinfection I will not here discuss, further than to say that in cases of exposure cultures should be made both aerobically and anaerobically.

The subject of bacteria in the air has been frequently discussed. There is no doubt that pathogenic bacteria may be found in the air. That the air of an operating-room should be free of them goes without saying. The number of bacteria of all kinds in the air of a room is in direct relation to the dryness of the atmosphere and surfaces and the activity of the persons therein. In this clinic during a ward class there were four bacteria per liter, while in the private operating-room during a quiet operation there were two per liter. The former number I might add is about what one finds on a quiet, sunny day in the country.

I wish here to mention a method I employed in the air examinations. The filter was of the Frankland type, modified by the addition of a small quantity of gelatin to a filter of alternate layers of mineral wool and powdered glass. The gelatin makes the filter very tight, air passing through quite slowly, about 20 liters an hour. From the air in this clinic I obtained *B. mycoides,* a white coccus indistinguishable biologically from *M. pyogenes albus,* yet non-pathogenic, but liquefying gelatin too rapidly to be called the *M. epidermis albus.* In the air from the quiet operating-room only *B. mycoides,* a mold, and a few colored air colonies were cultivated.

The subject of bacteria in quiet and moving air was well discussed by Hunter Robb (*Am. Jour. Obstet.,* 1909). A most beautiful demonstration of the effect of simple cleaning is to be found in his paper. The walls of his operating-room were thoroughly cleansed with soap and water. Four days later he obtained 20 colonies in 710 minutes, and three weeks later practically none grew on plates exposed for the same length of time. The room had been unused. Under operating conditions before cleaning he had found as many as 1700. He finds that washing the floor with an antiseptic solution much reduces the number of bacteria in the air. He does not find that the electric fan running in the room has much effect upon the numbers falling upon his plates, and concludes that the fans should be without danger. He says that in a quiet room, Sunday, with the fan going, practically no bacteria fell upon the plates. His work shows definitely the effect of settling. This admirable paper should be read by all interested in the subject. His method of measuring the air bacteria may be open to some objections, but the effect of moving air upon bacterial content is beautifully expressed.

The organisms that have been found in the air in clinics and throughout hospitals in order of their pathogenicity are: streptococcus, staphylococcus, colon bacillus, *B. pyocyaneus, Bact. diphtheriæ, B. mucosus aerogenes, B. aerogenes capsulatus,* and a few others of less importance. This of course does not take into consideration air organisms. These organisms are brought in chiefly by the feet and in the throat. This indicates that the mere wearing of a white gown by a spectator is useless and that the face mask is imperative for the onlooker as well as for the surgeon. The propulsion of the bacteria from the speaking mouth was shown several years ago by Flügge, who obtained on plates exposed several minutes before a speaking person cultures of *B. prodigiosus,* which organism had been introduced into the mouth artificially. The introduction of dirt on the feet seems to be a very important factor, when we consider

that Robb found a diminution in air bacteria when the floors were cleaned with an antiseptic solution. The wearing of street shoes into operating-rooms should therefore be prohibited. Shoes, boots, or gum slippers kept in a disinfectant solution should be supplied.

Disinfection.—A word first concerning infected objects in the operating-room. They are usually of such a nature that bacteria will continue to grow. If surfaces of pus gauze or pus drops dry, bacteria may escape. Such materials should never be put upon the surgical tables, nor should pathological specimens be opened in the operating-room. A bucket of disinfectant solution should be kept for the receipt of all infected objects discarded from the operating area, and an attendant should remove with a mop, wetted with a disinfectant, all infective material dropped upon the floor.

My reason for suggesting the observation of spore-bearing air organisms and the anaerobic culturing of all objects likely to affect the operation site is that while they may not be themselves pathogenic they may settle upon a dried serous surface, adhere, and by a non-specific reaction on the part of the body irritate the part sufficiently to make it more permeable for pathogenic organisms either from within or without. For this reason non-pathogenic organisms should be excluded if possible.

By inference from Robb's work it would seem advisable to wash the walls and floor after each operation. The cleansing of all surfaces should be done with an effective soap or powder like naphthalene or gold dust and followed by hot water. A hot-water flush hose is desirable. For sterilizing the walls and floor a solution of 1:1000 bichloride of mercury or 1:20 carbolic acid with 5 per cent glycerin is the best. The glycerin is used to hold the carbolic in solution, soften any organic matter on which the germicide may fall, and to protect the carbolic when the water shall have evaporated from the surface to be disinfected.

In especially important instances disinfection by formalin spray or the generation of formaldehyde gas by the following formula should be done: Potassium permanganate 17 oz., formaldehyde solution 20 oz., per 1000 cubic feet. Objects in the operating-room do not readily hold formaldehyde odor, but should it remain the spraying of a little ammonia water about will rapidly remove it.

For hardware of any kind that will endure direct water sterilization, 100° C. for twenty minutes should be employed. Dressings and the like require steam at 100° C. + with 10 pounds pressure for fifteen minutes.

Conclusions.—In drawing practical conclusions from the foregoing in the order first mentioned, I would say that all surfaces of the operating-room should be made clean each day by thorough cleansing with water and soap or flushing by a pipe attached to the boiler. After pus cases it should receive treatment of carbolic or bichloride, or under serious conditions by formaldehyde gas. It should be protected by the exclusion of any hospital attaché having angina, infected wounds, and the like; by prohibiting the wearing of street shoes; by the wearing by all persons therein of a gown and mask covering all but the eyes; and by the bacteriological examination of all materials used in the room, of the air and surfaces when infections have occurred without good cause.

EDITORIAL.

THE IMPORTANCE OF RECOGNIZING THE VALUE OF HIGH BLOOD-PRESSURE.

In less than twelve years the estimation of the blood-pressure by the sphygmomanometer has come to be resorted to with even greater frequency than the estimation of the body temperature by means of the clinical thermometer. Every one of the past ten years has brought forward one or more points in connection with this comparatively new branch of clinical study. Some of these points have been of very great importance in their bearing upon general medicine, and others have been of great value as indicating the exact scope and importance of this aid to clinical study.

More than five years ago the writer of this editorial note pointed out that in many instances a high blood-pressure is not to be considered as abnormal in the sense of an evil, but rather as a means devised by Nature for the maintenance of an active circulation in the face of arteriocapillary fibrosis and spasm. In other words, a high blood-pressure may be said to be, in the majority of instances, as necessary for the maintenance of an approximately normal existence as cardiac hypertrophy is essential if life is to be maintained in the presence of chronic valvular disease. To express it differently, a high pressure is essential in order that the blood may pass with reasonable freedom and quantity to the tissues which require it, even though the blood paths are tortuous, unyielding, and narrow.

While it is true that a diastolic pressure of 80 to 90 and a systolic pressure of 120 to 130 may be said to represent the normal bounds for perfectly healthy adults, it is not to be forgotten that in the presence of disease these so-called normal standards are to be, to some extent, ignored. We frequently see cases in which the physician has endeavored to reduce an abnormally high blood-pressure to one which is approximately and theoretically normal with the result that the patient first suffers from lack of initiative, then from actual feebleness and dyspnea on exertion, and finally develops a state in which he is far more wretched than before therapeutic measures were instituted. In other words, these cases are instances of the fact, which we are coming to recognize more and more, that Nature often knows what is best for the patient, and the physician should not meddle with Nature's methods until he has good reasons for believing that they have become injurious, or, if we may use such a term, unwise.

We are glad to see in the *Lancet* of May 3, 1913, that Mantle of the Halifax Royal Infirmary once more emphasizes this point, upon which we have dwelt so much that at times we have feared that we were giving it undue importance. After pointing out the fact, which is all too true, that extraordinary variations in blood pressure are produced by anxiety and emotional disturbances, and that therefore repeated estimations of the pressure when the patient is at rest are necessary, he proceeds to emphasize the points that we have just named, and quotes Oliver as having pointed out that high blood-pressure is often a compensatory effort and one of the natural defenses of the body. He then cites an interesting instance of a man of sixty-five who had a blood-pressure of 180 millimeters of mercury, an enlarged heart, and dyspnea on exertion. There was no albuminuria, and the vessels were not palpably thickened. Mantle recognized the fact that his difficulties depended more upon his pressure being lower than his needs than upon the fact that it was too high, and instead of giving him treatment designed to reduce the pressure he gave him strophanthus and nux vomica to raise his pressure and Nauheim baths and Schott exercises to open up his peripheral circulation, with the result that after three weeks' treatment his blood-pressure was 195, the heart more regular, and the disagreeable symptoms in abeyance.

Later when his pressure was 200 he was very comfortable. Instances of this kind might be cited in great number. They serve to impress upon us a very important clinical fact worthy of the consideration of every clinician, whether he be in medicine or in surgery.

PHARMACOLOGICAL INVESTIGATIONS UPON MAN.

The last forty years have resulted in a great increase in our knowledge concerning the influence of drugs upon the vital functions of the lower animals and indirectly upon the vital functions of human beings. No one can deny that the results obtained in the pharmacological laboratory have placed therapeutics on a far firmer basis than it was in the days of empiricism, but it also is an undeniable fact that the results obtained from animals are not always identical with the results obtained in man. At the present time we are glad to note that through the introduction of instruments of precision which can be applied to man this field of investigation is being opened. Too much encouragement cannot be given to those who are pioneers in these lines. For this reason we have read with much interest a report on the effect of strychnine and digitalis in man made by Marvin in the *Archives of Internal Medicine* of April 15, 1913. Marvin well says that he is inclined to believe that the difference in opinion which has existed between pharmacologists and clinicians regarding the effects of important drugs lies in the fact that the former bases his views upon the results obtained from the lower animals in health, while the clinician reaches his conclusions from the effects of the drugs upon the human being in disease. No more valuable illustration of this difference of opinion as to result can be cited than the effect of alcohol, which not only differs in its action in the lower animals and man, but differs materially in its action in the healthy man as compared to its effects in the diseased man.

Using students at the University of Vermont as his subjects, Marvin first made observations upon normal respiration, pulse, and blood-pressure. After completing these observations, strychnine sulphate was injected hypodermically into the muscular tissue of the upper arm, and records were then made every five minutes on respiration and pulse, and every ten minutes on blood-pressure. Different doses of strychnine were used, varying from 1/20 to 1/40 of a grain, and sufficient time was allowed to elapse between experiments to prevent the doses from being cumulative. He found that doses varying from 1/40 to 1/20 of a grain had no appreciable effect on the rate of respiration, but he apparently failed to make any estimations as to changes in the depth of respiration, which is quite as important as a change in rate. A 1/40 of a grain slowed the pulse-rate per minute five beats and 1/20 eight beats. The maximum effect seemed to be at the end of forty minutes. A 1/40 of a grain produced a rise of blood-pressure equivalent to 3 millimeters of mercury, and 1/20 grain equivalent to 8 millimeters of mercury. Marvin believes that his results prove positively that strychnine does increase blood-pressure in healthy human beings, the more so as in a similar series of experiments where the drug was placed under the tongue identical results were reached.

Concerning digitalis and using a standardized tincture which had been tested upon guinea-pigs, he found that 20 minims of such a tincture caused an average increase of blood-pressure of 13 millimeters, which reached its height in five hours, and this effect persisted to some extent until after fifty hours had passed. There was also a slowing in the pulse-rate of eight beats per minute, but there was no change in respiratory rate. These observations are of particular interest not only for the reasons that we have given, but also because a number of recent writers have claimed that the administration of digitalis to man does not cause a rise of blood-pressure as it so constantly does in the lower animals.

CARDIAC STRAIN AND ANESTHESIA.

It not infrequently happens that when a drug is strongly indicated to meet a certain condition a contraindication exists which forbids its employment. This also holds true in regard to remedial measures other than drugs, and undoubtedly is a factor of importance in connection with a number of surgical procedures. Surgeons have long since learned that a heart which has suffered from degenerative change, or kidneys which have suffered as a result of prolonged disease, stand in the way of operative procedure. We have often thought that certain of the positions in which patients were put during operation must exercise a powerful influence upon the circulation, and we are therefore much interested in the contribution which is made to the *Journal of the American Medical Association* of April 26, 1913, in which Gann and Mann have studied the effect of the Trendelenburg posture. They note that the head-down position is badly borne by patients with cardiac disease or by those who have obstruction of the breathing. All those who have worked with animals in a laboratory know that local changes can be produced in the circulation by placing the animal in a position which is at variance with its normal posture in life. Thus, it has been noted that rabbits held in a perpendicular position may be killed in as short a space of time as fifteen minutes by bleeding to death into their splanchnic veins, and although Hill showed that a normal animal can be placed in the head-down position for a long time without ill effects, Gann and Mann found that this was not the case if the animal was anesthetized with ether. They give tracings which illustrate the extraordinary effect produced upon the action of the heart and respiration by changes in posture.

As a result of their investigations Gann and Mann believe that there are three classes of patients which are liable to be injured in the course of anesthesia by overdistention of the heart, namely, those with a well-developed muscular system, those who are alcoholic, and those who have circulatory disease. Some of the danger may be put aside by the use of morphine and atropine before the operation. They also conclude that although the Trendelenburg position is harmless for a patient with a normal heart, provided the respiration is free and unobstructed, it is dangerous if the circulation is feeble or the respiration is impaired, and if this posture is essential the greatest care should be exercised in inducing it. In other words, the patient should be brought into the Trendelenburg posture gradually and not suddenly, as is so often done by the tipping of the special table designed for this purpose. Doubtless atropine is advantageous in these patients since it tends to maintain circulatory equilibrium by its influence upon the splanchnic vessels.

DEATHS FROM THE USE OF SALVARSAN.

Perhaps the most surprising feature of the new arsenical treatment of syphilis, aside from the promptness, if not the permanency of the therapeutic effect, is the comparative freedom from immediate danger or remote consequences.

In a review of this subject by Schalek (*Urologic and Cutaneous Review,* July, 1913), Wechselmann is quoted to the effect that salvarsan is no more injurious than any other intensive method of treatment. He believes that most of the deaths are due to the combination of salvarsan and mercury. It is known that the kidneys eliminate a great amount of arsenic. This may happen after a first injection, but after a second the elimination may become insufficient. Since the mercury affects the kidneys in a greater degree than the salvarsan, it may so damage this organ that the salvarsan cannot be taken care of. Death after salvarsan does not occur through uremia, but through an insufficient function of the kidneys which causes the salvarsan to be retained in the system. Another danger

comes from a latent tuberculosis of the meninges. Therapeutically it must be remembered that mercury should only be given cautiously and after the lapse of some time after the administration of salvarsan. Careful technique, accurate dosage, examinations of the urine, and consideration of the temperature and the general feeling of the patient are important in the treatment with salvarsan, and especially in the combined treatment.

Busse and Merian (*Münchener med. Wochenschr.*, 1912, No. 43) report a death after the use of salvarsan. A girl, eighteen years old, had 30 inunctions for secondary syphilis; four weeks later, on account of a recurrence, two injections of neosalvarsan, each 0.6. Two days later convulsions, coma; death the fifth day. Autopsy showed hemorrhagic encephalitis and degeneration of the kidneys and the heart. The authors consider the death due to arsenic poisoning, as multiple hemorrhages in the central nervous system have been observed in arsenical poisoning.

Wahle (*Münchener med. Wochenschr.*, 1913, No. 7) reports two cases of neosalvarsan poisoning. The first was a man of twenty-one years; initial lesion, roseola; received neosalvarsan 0.9. The second day there were emesis, headache, considerable albumin in urine. Recovered in two weeks. The second case, a man of twenty-two years, received neosalvarsan 0.9. Emesis for two days, high amount of albumin in urine; finally anuria for two days. This was followed by pneumonia and pleurisy. The cause of the intoxication is uncertain. The last patient had previously to the salvarsan injection undergone a sulphur treatment for scabies, and the sulphur may have irritated the kidneys.

Bernadot (*Annales de Dermatologie*, 1913, No. 1) reports a case of death in a healthy except for syphilis woman, twenty-five years old, after an injection of 0.4 neosalvarsan. Unconsciousness, convulsions, coma the fourth day; death the sixth day. Autopsy showed thickening of the meninges, enlargement of the kidneys.

Wechselmann concludes a truly admirable paper upon this subject as follows:

"We are justified in saying that salvarsan *per se* employed in normal persons in the customary dosage is non-toxic. Evil consequences observed are always due to organic insufficiency, especially of the kidneys. For this insufficiency the responsible factors are frequently mercury, exceptionally salvarsan; also other weakening factors, such as the influence of syphilis on the blood-vessels or other infections and intoxications. If the most effective results are to be secured from salvarsan it is of the greatest importance to carefully heed the foregoing points during the drug's administration.

"It is quite conceivable and, in fact, justifiable, that some physicians, following early experience with the other arsenic compounds, were distrustful of salvarsan from the very beginning, and friends of salvarsan, even though they had seen its prompt healing effect, feared that the not too well understood collateral effects might operate to deprive us of the advantage of this agent. But this stage is now passed. One should not forget that the same opposition arose against mercury at the time of its introduction as now against salvarsan. Let us now remember that from 1580 to 1655 every teacher at Heidelberg had to take an oath that he would never use mercury! It is this divided condition of opinion among physicians which permits, even to the present, the quack to thrive so well! The standpoint of those physicians who recognized the value of mercury even in early days, and who through the greatest care reduced its evil effects to the lowest possible point, at last prevailed."

Wechselmann's entire experience with more than 25,000 injections forces him to the inevitable conclusion that salvarsan is much less toxic than mercury. His department, in which salvarsan is used almost exclusively, has given him much less care and trouble during the past three years than in the previous period when mercury was employed; it is certain that the undesirable

effects of salvarsan have become rarer and of less importance as we better learn to master the technique of its use and to employ a dosage adapted to the individual case.

The clinician always has to deal with ununiform clinical material, and in that lies the main difficulty of properly employing a remedial agent which has been experimentally tested in a laboratory. The hope of a cure for infections binds the experimental worker and the clinician, but the material upon which they work is radically different. There the healthy animal with sound organs; here the patient exhibiting the most varied deviations from normal. Therefore, without the systematic, definitely planned aid of the clinician the introduction of a chemotherapeutic preparation is impossible.

Generally speaking, it is highly probable that salvarsan fatalities which occur shortly after the injection of the agent, particularly within a few hours, are the result of some unobserved error. A fact that points in this direction is the circumstance that such cases are rarely reported, and especially so by physicians who have had a large experience in this character of work. Especially dangerous may be the omission of the alkali when the solution is not sufficiently diluted. Furthermore, the introduction of a large dose of salvarsan in the presence of the so-called "anaphylaxis" might easily be the cause of death.

From the literature of reported cases of deaths, one can see that such fatalities form a variegated group without showing a distinct type. In only the smallest number of these cases can death be attributed directly to salvarsan. The marked differences in the clinical pictures of fatal cases, among which encephalitis hemorrhagica is a frequent type, show that salvarsan, in so far as the greater number of cases is concerned, is but an indeterminate factor and not a distinct cause of death. Thus no uniform explanation fitting all cases can be given. A glance at the reports of fatalities is sufficient to show how recklessly salvarsan was employed at first, and it is certain that many of the fatalities could have been avoided.

The precautions are: The most exact technique. A dose of the drug carefully adapted to the individual case. Careful observation of the urinary secretion when employing salvarsan; resorting to the most exact chemical and microscopical examination of the urine. This holds good particularly when the combined treatment is employed. As to the conjoint use of salvarsan with heavy mercurial treatment, the mercury should be given carefully many days after the last salvarsan injection, never before it. Every general reaction or rise of temperature, following the use of salvarsan, should be fully investigated as to its cause. Only by close observance of the above will it be possible to begin the more refined, scientific investigation of apparently so simple, but in reality highly complicated, an occurrence as a salvarsan fatality.

In Wechselmann's communication the most important teaching is that bearing upon renal function, upon the fact that arsenic may exert its toxic action without clear indices which may be derived from urinary examination; that mercury acting differently, and an even more potent toxic agent, causes characteristic urinary findings; that the combined drugs, acting upon both blood-vessels and epithelium, may be more deadly than either given in full doses alone; that the efficient use of either implies adequate function on the part of the kidneys; that functional tests always should be conducted before either drug is given in full dosage.

SELENIUM IN THE TREATMENT OF CANCER.

Perhaps the profession has built more largely than they realized upon the hope that Ehrlich might crown his astonishing work in syphilis with the discovery of a remedy equally potent against cancer; this hope being founded upon the short para-

graphs and notes which have from time to time appeared regarding Wassermann, Neuberg, and Caspari's work with selenium. By it they have been able to procure resolution of at least mouse cancer. The first clinical communication of note bearing upon this subject comes from Bougeant of the Rothschild Heidelberg Polyclinic, who reports upon the use of red electroselenium, this preparation having been chosen because of lesser toxicity, in the treatment of sixteen inoperable cancers. The preparation was injected intravenously in doses of from 5 to 10 Cc., repeated every second day. In some instances the dose was raised to as high as 30 Cc. No pain was caused. Aside from chills and fever, most marked in the beginning of the treatment, there was no apparent ill result caused. It is to be noted, however, that there were no cures, and that the most Bougeant, presumably an enthusiast and most anxious to see the best, claims as the result of his treatment is that it lessened pain and in some cases caused a diminution of the tumor and a prolongation of life beyond that which normally would have been expected without the treatment. Galliot confirms these findings, most disappointing to a world convinced that a cure for this malady will be found and waiting impatently for its announcement.

It is to be noted that the results of this clinical trial are in no way better than those announced time and time again as following methods of treatment for a brief period popular because of the autohypnotism of their advocates, and promptly abandoned and now forgotten because of their futility. Ehrlich when asked a year ago concerning selenium had nothing to say. When he speaks the world will stop to listen.

REPORTS ON THERAPEUTIC PROGRESS.

TINCTURE OF IODINE IN THE TREATMENT OF FRESH WOUNDS.

Ore in the *Journal of the Missouri State Medical Association* for May, 1913, says he believes the value of the tincture of iodine as a skin and wound antiseptic is probably due to its penetrating power, to its dehydration properties, and to its production of hyperemia, which stimulates the reaction of the tissues against infection. As a germicide for the ordinary forms of bacteria it well deserves the recommendation given to it by Senn. The experiments of Post and Nicoll show well its rank as a germicide in the test-tube. They found that the U. S. P. tincture of iodine would kill the streptococcus, pneumococcus, gonococcus, and bacillus typhosus in less than one minute.

For the past eighteen months, while on the house staff at the New York Hospital (House of Relief), Ore has used the U. S. P. tincture of iodine in the treatment of fresh wounds, in the dispensary, on the ambulance and in the hospital. During this time he has treated nearly one thousand patients with incised, lacerated, and contused wounds, dog bite, compound fractures, traumatic amputations, etc., with excellent results.

The more simple the technique used the better. If the area about the wound needs shaving it should be shaved dry. Any loose tags of tissue or skin or foreign body should be removed with sterile instruments and not washed out. No water or watery solution should touch the wound. The tincture of iodine is first painted about the wound and allowed to dry for a short time, giving opportunity for penetration. Then with another bit of sterile cotton on a toothpick the wound itself is painted thoroughly. Dannreuther's method of injecting the deeper recesses of a wound with a medicine-dropper is a good one, but should not be depended on entirely in cases of puncture wound in which there is a liability of tetanus infection. A sterile compress is then held firmly over the wound, if it is small, until hemorrhage is stopped, and a

sufficient number of sutures applied to approximate the edges of the wound when indicated. In the large lacerated wounds the iodine may be poured into the wound after painting a free area about it. Drainage should, of course, be used when indicated, especially in the badly contused lacerated wounds where there is apt to be much oozing and the resistance of the tissues is much below par.

In traumatic surgery the tincture of iodine seems to be the best of all antiseptics. It is handy, reliable, easily applied, and acts quickly. There is no bother about making up solutions, washing, scrubbing, or irrigating. It is ideal where rapid work is necessary, as in large dispensaries, on the ambulance, and on the battle-field. For the country practioner it is infinitely more convenient and reliable than any antiseptic solution. In the Russo-Japanese war the use of iodine in the emergency treatment of wounds no doubt had much to do with preserving such a low mortality.

Ore feels that the tincture of iodine should be recommended in the text-books and be more widely used in the treatment of fresh wounds of all kinds, and especially he recommends its use to the country practitioner and to those who must treat a large series of patients rapidly, as in a dispensary or on a busy ambulance.

GENERAL PARALYSIS OF THE INSANE.

ROBERTSON, in the *Journal of Mental Science* for April, 1913, has this to say of antisyphilitic treatment in this disease.

The form of treatment which Robertson has devised consists in the employment of the following agents:

1. The intravenous injection of salvarsan. The amount used varied with the strength of the patient, but was 0.3 to 0.6 of a gramme for the average man, and 0.2 to 0.3 gramme for the average woman. These were repeated three or four times at intervals of a month or so.

2. The intraspinal injection of antisyphilitic serum. This serum was obtained from patients suffering from the secondary stage of syphilis, who had three days earlier been given an injection of salvarsan. This serum is highly charged with syphilitic antibodies, and it was administered because it had been suggested that a possible explanation of the disappointing results of antisyphilitic treatment in general paralysis was the inability of the patient through exhaustion to produce antibodies. This serum was injected intraspinously in order to bring the remedy near the seat of the disease. It was usually administered in the intervals between the salvarsan injections, and it seldom produced any noticeable reaction.

Preparation of Serum.—The method of preparation was as follows: 20 or 30 Cc. of blood was withdrawn with aseptic precautions by venepuncture from the arm of a syphilitic patient who had been treated three days previously with a full dose of salvarsan. This was allowed to clot, and care was taken to separate the clot from the side of the tube, which facilitates the formation of the serum. At the same time cultures were made from the serum, and the clotted blood was left on ice for about twenty-four hours. If the serum was sterile it was gently poured into a sterile flask with other sera, thus making a mixed serum, and in some instances it was found necessary to centrifuge the serum. Ten or 15 Cc. of this mixed serum, twenty-four or forty-eight hours old, was used for injection. A nonsterile or suspicious serum was always discarded. A record syringe was used for the injection of the serum, as the point fits the end of the lumbar puncture needle accurately. Before making the injection an amount of spinal fluid was withdrawn, equal to that of the serum which it was intended to inject.

3. The intraspinal injection of salvarsan serum. Owing to the cerebrospinal fluid being chiefly a secretion, many drugs, *e.g.*, iodide of potassium, do not reach it; salvarsan administered intravenously is found in it, though only in minute quantities. The salvarsan serum injected intravenously was a means devised of bringing the drug in fair quantities into the fluid and into immediate contact with the membranes. It was

obtained by drawing off by venepuncture some of the patient's own blood an hour after he had received an intravenous injection of salvarsan. It was only administered on a few occasions, and it was followed by a slight rise of temperature. The direct administration of salvarsan itself intraspinously would almost certainly be fatal, judging by its results on rabbits, when thus administered.

The salvarsan serum was collected and treated in exactly the same way as the antisyphilitic serum, but the injection was given before the serum was twenty-four hours old and in smaller doses, 3 or 4 Cc.

4. Urotropin. While the patient was undergoing the antisyphilitic treatment he received full doses of urotropin (10 grains t.i.d.), as marked improvement has been reported in several cases of general paralysis while undergoing this form of treatment. It is secreted in larger quantities than most drugs into the cerebrospinal fluid, and thus its bacteriological powers may act here as well as in the bladder.

5. Calomel. This was given twice weekly.

The solid results obtained by this treatment were disappointing, but it seldom happened that a patient did not show some slight improvement in his symptoms after the first or second injection. As an instance of this Robertson mentions the case of one patient who wrote several characteristically insane letters just before receiving his injection. Next day he was much improved, and asked the matron for the letters he had written the day previous, and on receiving them tore them up and threw them into the fire. In five out of the twelve cases treated at Craig House there was considerable excitement, and all of these benefited and became calmer. Three of the twelve cases recovered sufficiently to be discharged from the asylum, and of these one relapsed after six months, another several months afterward met with a fatal accident at home, while the third has remained well for a year. This last case was exceptional in the long duration of the incubation period, having been definitely infected thirty-eight years previously, but there was also the history of a possible reinfection six years later. Unfortunately, so far as deductions favorable to salvarsan are concerned, it has been Robertson's experience to see a similar temporary improvement in the symptoms of general paralysis from every form of vigorous treatment that he has applied, especially if applied soon after admission.

In none of their patients did the Wassermann reaction become negative, but in a number there was a distinct diminution in its intensity, which increased again later on. On the Continent, Alt and Willige report that they produced a negative reaction in the serum in one-fifth of their cases, but these also in a few months became positive again, although in some cases not for a year and a half. In some cases, however, it remained negative for a year and a half. In three of their twelve cases there was a marked and durable diminution in the number of lymphocytes, and in three others it was slight and of a temporary nature. He found that the number of lymphocytes and the amount of complement deviated in the Wassermann reaction vary without treatment and without apparent relation to the acuteness of the symptoms, but the above changes were of a sufficiently striking nature to be noticed. There was no change in the amount of the globulin or albumen. Roughly speaking it may be said that in one-half of their cases there was evidence of improvement as regards the Wassermann reaction and the lymphocytosis—signs that the activity of the disease process had diminished.

On carefully weighing these results of the use of salvarsan in the treatment of general paralysis, which are similar to those recorded by others, the opinion Robertson has arrived at is that the treatment was not vigorous enough either as regards the amount of salvarsan administered, the number of the injections, or the rapidity with which these succeeded one another. He was dealing with a new drug, the administration of which in a severe nervous disease is not without an element of danger. The measures, too, were half-hearted, because his belief in the syphilitic nature of general

paralysis was wavering and inconclusive so long as the parasyphilitic theory of Fournier could not be disproved or held to be improbable. The situation is now entirely changed by the experience gained during the last two years of the treatment of other forms of syphilis by large and repeated doses and by Noguchi's discovery of spirochætæ in the brains of those suffering from general paralysis. Very few persons will now be found to deny the syphilitic nature of general paralysis, and Robertson asserts he cannot conceive of any medical man denying that the spirochætæ found among the nerve-cells of the cortex are one factor in the causation of the symptoms, in those cases at least in which they are found. With this sure foundation on which to base our treatment we can now act with vigor and determination, unhampered by doubt.

It has been found that, speaking generally, the longer syphilis has lasted the more intractable it is to treatment by salvarsan, and general paralysis is a very late manifestation. Judging from this fact alone it might be concluded that it would prove to be intractable, and from the intensity and constancy of the Wassermann reaction it might be inferred that it was not only a late but a very extensive and active infection. It therefore calls for the maximum intensity of antisyphilitic treatment.

THE ACTION OF DRUGS ON THE RESPIRATION.

CUSHNY in the *Proceedings of the Royal Society of Medicine* for April, 1913, says he has tried two stimulants to respiration —namely, caffeine and strychnine. Caffeine, as a rule, accelerates, and at the same time often renders the respiration rather shallow. In other cases in which the large dose of caffeine causes spasmodic movements both rate and depth are increased. The increase in rate is due to direct action on the center, for it occurs when no movement is present and when the depth of the breathing is actually reduced. The deeper breathing observed in some experiments occurred only when movement was present, and passed off as the animal became quiet again, so that it appears to be due to the increased CO_2 tension from the movement. As the caffeine action passes off, which it does very rapidly, one finds a return to the normal. Caffeine acts in the opposite way to morphine, and the same is true of strychnine. They act upon the rate, but not directly on the depth. The changes in the depth are due almost entirely to change in the carbonic acid tension, which, of course, is largely indirect, from the acceleration of the respiration reducing it, or from slight spasm increasing it. The action of caffeine is very much more marked under morphine, and its action persists for a much longer time. In normal animals there is an acceleration under caffeine, which, as a general rule, passes off in ten minutes at the most. Under morphine it may last half an hour or so after the injection.

Under caffeine Cushny saw, twice, on stimulation of the vagus, that a strength of stimulation that previously caused inhibition now caused acceleration; that is, a reversal phenomenon was presented by the respiratory center, similar to that which has been described by Sherrington, Bayliss, and others, in the reflex response under strychnine. On the other hand, he did not get this reversal under strychnine because of the difficulty that strychnine, given in any but the most minute quantities, causes spasm, and spasm throws a burden of carbonic acid on the center which altogether vitiates the experiment. But such a reversal under strychnine has been described by Seemann lately, who prevented the spasm by giving large doses of urethane. The animals with cut vagi responded by acceleration to caffeine and strychnine as intact animals do. The point arose whether caffeine or strychnine could replace carbonic acid in the action on the center; but Cushny asserts he has no evidence that this is so. On the contrary, they accelerate respiration after cutting the vagi, while carbonic acid fails to do so, which shows the different method of action.

THE DURATION OF PROTECTION AFFORDED BY VACCINATION, AND THE IMPORTANCE OF DOSAGE.

The *Lancet* of May 3, 1913, points out that during the smallpox epidemics of the last century, and particularly in the pandemic of 1871, there were few questions with which medical men were so familiar or to which so much attention was given as the evidence of the duration of the protective effect of vaccination against smallpox. It was customary to measure this by different criteria: the proportion of fatal to total cases at different ages, the proportion of mild or modified cases to total cases, and the relative incidence of smallpox on the vaccinated and unvaccinated at different periods of life. The conclusions which became generally accepted as a result of these observations still govern practice and are taught at the present day; but it is natural to inquire, during a period of long immunity from smallpox epidemics, and at a time when comparatively few men obtain their knowledge of the disease from direct observation, whether it is now necessary to revise them in consequence of changes in the type of smallpox, or of differences between modern and ancient vaccines and methods of vaccination, or on account of other causes which may have been at work. Dr. W. Hanna, assistant medical officer of health for the Port of Liverpool, has taken advantage of the systematic keeping of records in the Liverpool smallpox hospitals during the 1902-03 epidemic and subsequently, to make a critical examination of the facts in over 1100 smallpox cases, in their bearing on the problems to which we have referred, and by so doing he has rendered a very valuable service to medicine and public health. The results as a whole accord very closely with those of the earlier periods.

As regards case mortality at all ages, that of the natural disease—*i.e.*, in the unvaccinated, which ranges from approximately 25 to 40 per cent—was reduced by the power of vaccination to about 3 per cent in those who were well vaccinated. In the unvaccinated Dr. Hanna finds that it is persons at the extremes of life, mainly children under ten years and old people, who suffer most; in the previously vaccinated he has no case at all in children under three years of age and no deaths under twenty years, but as age advances the protective power of vaccination against death from smallpox and its power of modifying the severity of the disease are gradually lost. The fact that the duration of protection conferred by vaccination against attack by smallpox is much shorter than the duration of its power of modifying the disease is also well illustrated by the Liverpool figures; the influence of the latter can be traced far on into late life.

Vaccination may "take" and pass through a typical course when performed at any time between exposure and smallpox infection and the appearance of the rash if smallpox develops. During the first three days the degree of the protection thus conferred against attack is very high. Although Dr. Hanna does not find it absolute in those who are vaccinated for the first time during these early days of incubation, yet the course of the disease when it occurred in such cases was extremely mild. He is inclined to conclude that the modifying power of vaccination will be shown even when the case has not been vaccinated until the date of onset of smallpox, and that modification may take place as a result of vaccination performed after the disease has developed. The data for the last conclusion are small, but the conclusion itself accords with modern knowledge of vaccines generally, and the question is well worth further study at smallpox hospitals.

Dr. Hanna's observations on the significance of the area of vaccination scars are of special interest. There can be no doubt of the fact that the Liverpool experience bears out the statement that the scar area of vaccination has an important relation to the severity of smallpox; the larger the area the milder the character of the disease. It is, of course, important to take account of the natural growth of vaccination scars, which get larger as age advances until the 20-30 year age-period is reached, and then

gradually become smaller, in all probability owing to atrophy of the scar tissue. Analysis of cases in terms of number and area of scars should therefore be particularly directed to age groupings, and it is in this way that the evidence of the great importance of securing a sufficient dosage of vaccine in the performance of vaccination is best brought out. Dr. Hanna's little book, which contains some excellent illustrations of smallpox cases and of concurrent variola and vaccinia, will perhaps be in special demand by medical officers of health and public vaccinators, but it may cordially be recommended to a wider public.

THE VACCINE TREATMENT OF WHOOPING-COUGH.

Writing in the *American Journal of Diseases of Children* for May, 1913, SILL states that thirty-three cases of whooping-cough were treated with the pertussis vaccine, and in all the effect of the vaccine was to diminish markedly the number and severity of the paroxysms and the amount of vomiting.

Absolutely no untoward effects from the use of the vaccine were noted. There were no complications in the cases in which the vaccine was used; no abscess formation, or even slight temporary inflammation or swelling at the site of the injection, and no general constitutional symptoms occurred. The longest time any of the children coughed was twelve weeks and four days. The longest time any child coughed after it was put under vaccine treatment was nine weeks and one day, the average length of time being four and one-half weeks. The injections were given every two or three days in most of the severe cases, and in the very severe cases every day for a few days, until the symptoms were relieved; the milder cases did not receive the vaccine so often nor so much at a time.

In giving the vaccine Sill was guided more by the severity of the disease than by the age of the child. The youngest child treated was one month old and the oldest was six years. Most of the children were from six months to three years of age. The dose of the vaccine varied according to the number and severity of the paroxysms, from twenty million bacteria in the mild cases to sixty million in the severe cases.

The cases that were seen early in the attack, before the paroxysms had attained their height, seemed to respond more quickly to treatment and their course was shorter. In all cases, however, after one to three injections, the number and severity of the paroxysms was markedly lessened.

Some children seemed to respond better to treatment than others, and Sill attributes this to the fact that the dosage was given irrespective of the age; therefore, the younger children got a larger dose proportionately, and as a rule these latter were the ones that responded most quickly to the vaccine and had the shortest attacks after treatment was begun. This fact is important, since (heretofore) these young babies are so apt to have pneumonia complicating or accompanying pertussis, with fatal results.

It was found that the children did better when the vaccine was given in moderately large doses at frequent intervals of one or two days. A good example of this was in the case of a child fourteen months of age, which received 220,000,000 bacteria, or about forty million at a dose, about every two days for two weeks. This child had been coughing and vomiting for two weeks and was cured in two weeks, the vomiting having stopped on the ninth day after treatment was begun. Another very severe case was in a child a year old that had from twenty to twenty-four paroxysms during the day and as many or more at night, with a great deal of vomiting. This child had been coughing for six weeks when it came for treatment. Forty million bacteria were given about every three days, 320,000,000 in all, in four weeks, the time it took to effect a cure. There was a somewhat similar case in an older child with paroxysms not so frequent; it got the vaccine every two days for three doses and then every three days.

Still another case was put on the vaccine at once and was ill for only two weeks and

one day. Only sixty million bacteria were given, in three doses, but the child was only seven months old.

The pertussis vaccine, at Sill's suggestion, is now being put up in bulbs of fifty million to the cubic centimeter, and he believes the results with this more concentrated vaccine and the larger dosage ought to give considerably better results than he obtained, since in a number of his severe cases he found that forty million to sixty million bacteria at each injection were necessary to control the paroxysms and bring relief, and his opinion was confirmed that larger doses should be given and would effect a more rapid cure. The correct dosage for the mild cases is fifty million bacteria given every other day, while in the severe cases this amount should be given every day, or one hundred million every other day. The vaccine is given under antiseptic precautions, subcutaneously, with the ordinary glass syringe, the injection being given in the abdomen or buttocks.

A very interesting fact is that prophylactic treatment was instituted by giving immunizing doses of pertussis vaccine to children in a family in which one of the children was under treatment for whooping-cough. These children were watched over a period of two months, and although they had never had whooping-cough and were constantly exposed to the disease, did not contract it. It would seem, then, that the vaccine confers immunity to the child injected with small doses. One child of five years was given four injections of twenty million bacteria each, over a period of one month; another in the same family, three years of age, got nine injections of twenty million each, over a period of one month; neither child developed pertussis.

Ladd reports nine cases of pertussis which he treated with vaccine, beginning with rather small doses and running up to twenty million, and in four cases to forty million bacteria at a dose, to babies nine months of age. A minimum interval of five days was allowed between the injections, but in some cases the interval was lengthened to ten days or two weeks or longer. As a result of his investigation he concludes that in another series of cases he would give larger doses at shorter intervals.

When we consider how many of these cases of whooping-cough drag on for weeks or months and how many cases in infants terminate fatally from complications—since in the year 1908 in the registration area of the United States there were 4969 deaths from whooping-cough, or eleven out of every 100,000 of population, practically the same number as died from measles and nearly as many as die from scarlet fever—it is not too much to say that the vaccine treatment of this disease should ever be in our minds, and should be given a fair and thorough trial, and should also be given as a prophylactic measure to immunize children exposed.

Since writing this paper an article has come to the notice of the author in which three patients of the Boston City Hospital died of uncomplicated whooping-cough. An examination of their tracheas and lungs was made by Mallory and Horner, and it was found that these cases presented lesions which involved the ciliated epithelium lining the trachea and bronchi and which appear to be peculiar to this disease.

These observers found large numbers of minute bacteria between the cilia of many of the cells lining the trachea. This microörganism in most instances extended to the base of the cilia, the long axis extending in the direction of that of the cilia.

Masses of bacteria similar to those between the cilia were found in the secretions of the trachea and bronchi.

The organism found was a Gram-negative, minute, ovoid bacillus, which suggests strongly the bacillus discovered by Bordet and Gengou in 1900 and afterward in 1906 obtained in pure culture. They are probably an identical organism. The above-named observers believe this organism to be the cause of whooping-cough.

From these studies of Mallory and Horner it would seem that the action of the bacilli in the respiratory tract is apparently almost purely mechanical, because the presence of large numbers of these microörgan-

isms between the cilia interferes with their action and checks the normal expulsion of secretion. These bacteria also cause irritation, and this in turn brings about coughing and the characteristic whoop or spasm.

ETHER IN THE TROPICS.

It is a widely held opinion that in tropical climates ether cannot be used as an anesthetic. Very often the reason offered for not using ether is that "chloroform is so safe out there," but close questioning may lead to the conviction that safety of chloroform is sometimes synonymous with inperfect anesthesia for native patients. We very much doubt whether chloroform unscientifically administered to a deep degree of narcosis is less dangerous in India, say, than it is in England, and we are inclined to be equally skeptical as to the impossibility of employing ether. The temperature of operating theaters in Europe is fairly high. The artificially heated theater here should not, we imagine, be much cooler than the artificially cooled theater in a tropical country. Ether is freely used by evaporating methods in European and American operating theaters, and probably could be equally employed in many places where it is at present regarded as taboo.

We are strengthened in this opinion by an article in the *Bulletin of the Manila Medical Society* (February, 1913). This is from the pen of the anesthetist to the Philippine General Hospital, who writes with an experience of nineteen months in Manila, during which time there were some 1600 cases. The writer remarks that it was surprising to find ether being very satisfactorily administered in Manila. She (for the writer is a woman) went from Chicago, where opinion as to the use of ether in the tropics is much the same as that to which reference has been made above. Guided by what she saw, she instituted the giving of ether by the drop method, to which she was accustomed at home. This she finds quite satisfactory with the proviso that considerably—in her opinion from 15 to 20 per cent—more ether is required per patient than in cooler climes. The only real difficulty, as might be anticipated, is in the storing of the ether. The tin cans so commonly employed in America were not sufficiently air-tight, and much evaporation of ether took place from them. The ideal vessel she describes as a glass container. The boiling point of ether is about 95° F., and it should not be difficult in many tropical places to store ether where this temperature would not be reached, nor to procure it in bottles that would allow no leakage if so stored.—*Lancet*, May 3, 1913.

AURICULAR FIBRILLATION.

ZUNDEL in the *Clinical Journal* of June 4, 1913, says the treatment of auricular fibrillation resolves itself into an observance of the general rules of treatment of heart-failure and the use of digitalis, strophanthus, or squills. The patient must, of course, be confined to bed. If cyanosis and right-heart dilatation are great, the abstraction of six ounces of blood by venesection or the use of leeches will often be of great help; apparently by relieving some of the distention of the heart, it paves the way for the action of the cardiac remedies. It is impossible to exaggerate the importance of rest, and both physical and mental calm should be secured. In this connection Zundel strongly advocates the earlier and bolder use of morphine in heart-failure. The dangers of this drug in these cases are not as great as has been supposed, and the benefit from its use is often great. A contraindication to the use of morphine is the presence of a pleural effusion reaching to the sixth rib posteriorly, or the occurrence of nausea and vomiting. In the absence of these complications, the restlessness of heart-failure, especially if accompanied by pain, is, in Zundel's opinion, a direct indication for the use of the drug. Attention to the bowels and the modification of the diet, so as to avoid food which is indigestible or likely to give rise to flatulence, are as important as their necessity is obvious. Starvation for the first twenty-four or thirty-six hours is often beneficial, and

is rarely resented by the patient. With regard to the aspiration of ascites and the puncture of edematous legs, these measures are seldom necessary, but if a considerable pleural effusion is present and the breathing is much embarrassed, it is a good practice to aspirate the chest. Especial care is necessary to withdraw the fluid slowly and without forcible suction, owing to the danger of syncope.

The drugs which are of value are digitalis, strophanthus, and squills. These have a similar action, but Zundel treats in detail of digitalis only, for it is the drug in most common use, it gives eminently satisfactory results, and it is free from some of the disadvantages of the others—*e.g.*, it is less nauseating than squills, and its liquid preparations are more stable than those of strophanthus. In patients who have a high blood-pressure digitalis is not contraindicated, for careful observations have shown that it does not raise the blood-pressure in these cases as was supposed.

Digitalis has the disadvantage of being somewhat slow in action. Therefore it is well, while commencing its administration at once, to give three or four hypodermic injections of digitalis 1/100 of a grain or strophanthin 1/150 of a grain during the first thirty-six hours.

Very satisfactory results follow the use of tincture of digitalis, in doses of 20 minims, three times a day. It is best given alone in water without any other drug. It should be continued until symptoms of intolerance appear, unless the desired therapeutic effect is obtained with a smaller quantity of the drug. The unpleasant effects which may arise are nauseating and frontal headache of varying severity. Should these occur the drug must be discontinued for over two days, and then administered again in smaller doses. A later effect, and one which shows that the heart is fully under the influence of the drug, is "coupling" of the beats. To detect this the heart itself should be examined, for the second beat of the pair is sometimes too feeble to reach the wrist, and an examination of the radial pulse alone would fail to reveal the condition present. This coupling need not be taken as an indication for withdrawing digitalis altogether, but when it occurs the dose should be reduced. The beneficial effect of digitalis is usually heralded by a striking fall in the pulse-rate; diuresis occurs only in those cases in which edema is present. Coincident with the fall of pulse-rate there may be some diminution in cardiac dilatation, but this is not constant and is often very slight. At the same time there is a great improvement in the subjective feelings of the patient.

The action of the drug may be either to control the fibrillation and restore the normal auricular rhythm, or it may be confined to a steadying of the ventricle by interference with the passage of the irregular impulses down the bundle of His. The first result, which is, of course, the more desirable, is hardly to be expected if the fibrillation has been of long standing; it is seen typically when the abnormality is quite recent and is occurring in an earlier attack of failure in a rheumatic heart. In the old fibrotic heart it is practically never obtained. By interference with conductivity, however, digitalis is able to exert a very beneficial effect upon the ventricle. Owing to the partial heart-block produced by its action the ventricle is spared some of the continuous succession of irregular stimuli which come storming down upon it from the fibrillating auricle, and is able to recuperate more satisfactorily between its beats, which are, therefore, stronger and more effective. Indeed, so useful is this effect that patients may get up, take exercise, and even return to a moderately active existence in comfort with auricles that are still fibrillating provided that the ventricle is kept steady by the continuous influence of digitalis. For this purpose, small doses —*e.g.*, 5 minims of the tincture twice a day—may be sufficient, but the correct amount is easily found by experiement in any given case. So long as sufficient digitalis is given to keep the ventricular rate down to 70 or 80 the patient can continue in comfort even for years. The pulse in such a case does not become regular, but

so long as it is not allowed to become rapid the patient can enjoy a comfortable and fairly active life. Such a state of affairs is often seen in elderly men in whom fibrillation has ensued upon chronic degenerative changes in the myocardium. It is also seen in rheumatic hearts where the abnormality has not been treated early and has become persistent. In early rheumatic cases there is a good prospect of complete restoration to the normal auricular rhythm, but a heart whose auricle has once been in a state of fibrillation is prone to further attacks of the condition, and each attack tends to be more easily induced and to be more resistant to treatment than its predecessors.

THE DRUG TREATMENT OF UTERINE HEMORRHAGES.

In the course of an article on this topic in the *American Journal of Obstetrics* for May, 1913, NORD reminds us that among the many valuable agents which physiologists have given to clinicians few have excited more attention than adrenalin. Very shortly after the isolation of this principle, and the demonstration of its value in controlling local hemorrhages, Cramer suggested the topical application of a solution of adrenalin in the treatment of gynecological hemorrhages. In 1901 Langley called attention to the remarkable fact that adrenalin caused contraction of the uterus in the rabbit, but relaxation in the cat. He had previously shown that electrical stimulation of the hypogastric nerve had the same antithetic influence in the two species of animals. The conclusion is unavoidable that the contractions of the uterus, which are caused by adrenalin, are due to an increased excitability of the sympathetic nerve endings. As Wood points out in his article, these nerves are dominantly motor in the rabbit at all times, but in the cat and dog only during parturition. There is abundant evidence that adrenalin is an extremely active stimulant to the uterine nerves. So sensitive is the womb to the drug that strips of the uterine muscle have been successfully employed as a means of estimating the quantity of adrenalin in the blood. According to Kehrer, these muscle strips will react to one part of adrenalin in two hundred million.

Remembering, however, that the action is upon the nerve terminals, the question immediately presents itself as to the function of the hypogastric nerve in the human animal, and the action of adrenalin upon the human uterus. The only scientific attempt to answer this question, with which Wood is familiar, is the investigation made by Neu. This author injected solutions of adrenalin into the body of the uterus in a number of instances during the course of various gynecological operations in which the uterus was visible. As a typical instance: in a patient of fifty-three years of age in whom a hysterectomy was to be done, on account of the presence of myomata, after the uterus had been exposed, he injected a syringeful of the solution of adrenalin into the muscular wall of the uterus. Immediately the organ became "stone-hard and white," the pulse falling from 120 to 84. After this experiment the surgeon proceeded with the operation. Neu reports in all twelve such cases in which adrenalin was tested in non-pregnant women, with always more or less evidence of an effect upon the muscle of this organ. He does not appear to have tested the effects of internal administration of the drug in these cases. He did do so, however, in cases of labor. Wood quotes only one instance, a case of Cæsarian section, in which the intramuscular injection of adrenalin caused a violent contraction of the uterus. The muscular spasm lasted but a few minutes, but the tonus of the uterine muscle remained abnormally high for the next hour—that is, it required less amount of stimulation to cause a response than in the normal uterine condition.

From Neu's observations it would seem that adrenalin has two actions upon the uterus—one, an intense stimulation which is of a duration comparable to the vasomotor effect, which is followed by a much more permanent sensitizing influence.

While there is no doubt as to the ecbolic power of adrenalin, and while it may be of service in certain selected cases, Wood does not think that the dug is to be generally recommended for uterine bleeding.

Another valuable agent for which clinical medicine is indebted to the laboratory workers is the pituitary extract. The extract of the posterior lobe of the hypophysis is a splendid example of the debt which clinical medicine owes to pharmacology. In 1899 Schäfer and Vincent demonstrated that the injection of the extract of the pituitary body caused a rise in blood-pressure analogous, in extent at least, to that produced by an injection of the suprarenal gland. Some ten years after this Doctors Ott and Scott, of Philadelphia, demonstrated that this drug caused violent contractions when directly applied to the uterine muscle. This discovery was made independently, about the same time, by two German investigators, Frankl-Hochwart and Frölichs, who showed that the stimulant effect was evident, not only when the drug was applied to the uterine muscle, but also when it was introduced into the general circulation. Led by these results from the pharmacological laboratory, a number of German clinicians, following the early reports of Bell, have employed the drug to increase uterine contractions during labor, with the most striking results. For instance, Stern reports not only a number of cases of marked strengthening of the normal labor pains, but several in which the drug was used successfully to induce premature labor. The number of obstetricians who have reported upon this substance, and the unanimity of their opinions, leave no room for doubt that the pituitary extract is one of the most powerful stimulants of the uterine muscle which we possess. In cases of pregnancy the effects of the drug have been manifested within ten to twenty minutes after its hypodermic administration and last for several hours.

While there is an abundance of literature demonstrating the value of the pituitary extract during parturition, the use of it in non-obstetrical hemorrhages does not appear to have been nearly so common. Aarons has used it in menorrhagia due to subinvolution with satisfaction. An extraordinary case has been reported by Dr. Scott, in which the use of pituitary extract absolutely controlled the hemorrhage of inoperable carcinoma.

Like adrenalin, the pituitary extract has practically no effect when ingested by the mouth. It is necessary, therefore, to give it by injection, preferably into the muscle tissue. Although the active principle of the infundibulum is as yet unknown, there are a number of solutions upon the market which are suitable for hypodermic injection.

THE ABUSE OF THE X-RAYS IN THE TREATMENT OF SKIN AFFECTIONS.

BOWEN, in the *Boston Medical and Surgical Journal* of May 8, 1913, concludes that a great many cases of unnecessary disfigurement, more obvious than the original affection, are caused by an improper use of the *x*-rays.

That the cases suitable for this treatment can be selected only by those who have some considerable knowledge of skin affections.

That this method of treatment requires especial study and training and should not be regarded as an easy and safe procedure by those unskilled in its use.

SCOPOLAMINE-MORPHINE-ATROPINE AS AN ADJUNCT IN INHALATION ANESTHESIA.

MORCOM, in the *Proceedings of the Royal Society of Medicine* for April, 1913, asserts that the advantages of a preliminary injection of scopolamine-morphine-atropine as an aid to a general anesthetic are manifold. The drowsy condition into which the patients generally fall frequently enables the anesthetic to be administered without the patient waking up. This seems to be particularly the case in highly nervous patients—a very satisfactory point, as it is these patients who feel most acutely the preliminaries of the operation and the admin-

istration of the anesthetic. In this connection it should be mentioned that the initial administration of ether is sometimes liable to awaken the patient, owing to its irritation of the bronchial passages, so that it is best to commence the induction with some less irritating anesthetic. Personally, Morcom states he always uses the ordinary chloroform-ether mixture, and then continues with open ether when the patient begins to go under. If this is done the initial stage of induction is almost ideal; the patients are absolutely tranquil, there is no struggling or excitement, the respiration is deep and regular, and the pulse is full and slow. It is found that much less anesthetic is required to obtain surgical anesthesia, and this is certainly very marked in the case of open ether. Nicholson, in 1909, estimated this reduction at 50 per cent.

When anesthesia has been obtained the pupils remain contracted and react faintly to light, the corneal reflex being hardly ever lost. This latter fact may render it difficult to judge when a sufficient degree of anesthesia has been reached, but a good idea can be obtained by paying careful attention to all details, such as the condition of the respiration. The action of the atropine is noticeable owing to the fact that there is great diminution in the amount of the bronchial and salivary secretions, so that it is not necessary continually to clear out the mucus from the pharynx during the administration, and there is less tendency to postoperative bronchitis pneumonia. Indeed, Morcom asserts he does not recollect a single case of either of these complications arising in patients treated in this way. A number of surgeons have stated that it is impossible to obtain thorough relaxation of the abdominal muscles when scopolamine-morphine-atropine has been employed, but Morcom thinks this is the exception rather than the rule. It is in some cases due to the small amount of anesthetic employed, but very occasionally cases do arise in which it appears impossible to overcome this rigidity. He has been impressed by the fact that this rigidity is very rarely a prominent feature in abdominal operations, gynecological or otherwise, where the entrance into the peritoneal cavity is effected below the level of the umbilicus, and most of the cases in which it does occur are those in which operations are performed in the epigastric region, in which situation the recti show greater development.

After the operation the patient, almost without exception, sleeps uninterruptedly for three hours or more, and this may be considered the most advantageous fact in this connection, as it does away to a great extent with postoperative shock, and also with the postanesthetic vomiting, which is so often such a distressing feature. Felix Rood, in the *British Medical Journal* of September 23, 1911, in a report on 400 cases, states that in 255 there was no vomiting, 120 vomited once or twice, and 25 did so several times. At St. Thomas's Hospital, however, the diminution in number of cases of postanesthetic vomiting has been even more marked than this, and the Sister of one of the female surgical wards reports that out of fifty consecutive operation cases so treated not one case of postanesthetic vomiting occurred. This treatment has been found so satisfactory in the gynecological ward at St. Thomas's that all operation cases have the preliminary injection as a matter of routine. The small proportion of cases in this ward that have postanesthetic vomiting may be gauged from the fact that of the last 127 cases operated upon there only six have vomited; of these six, four vomited only once, and then only slightly, two were considerably affected for twenty-four hours after operation, but one of these latter was an acute case, and the preliminary injection was administered only ten minutes before the commencement of the operation. It should be mentioned that in this series the anesthetics were administered by different individuals, ranging from the senior visiting anesthetist to the most junior house officers.

A point that is frequently raised by critics of the scopolamine-morphine-atropine injection is that it greatly increases flatulence and constipation following operation, but the atropine tends to counteract the ef-

fect of the morphine, and Morcom's experience is that the patients do not have, as a general rule, any more trouble in this direction than those who have not had the preliminary injection. The dryness of the mouth, caused by the atropine, is sometimes complained of by the patients, but generally proves to be a minor trouble, and can be rectified by frequently washing out the mouth with water.

In conclusion, Morcom states that roughly 600 surgical cases pass through his hands each year, of all of whom he has the personal care, both before and after operation. Of this number, 40 per cent have a preliminary injection of scopolamine-morphine-atropine, and it is his honest conviction that these latter have a much better time in every way than those who are not so treated.

THE EXCRETION OF FORMALIN IN THE URINE OF CHILDREN AND IN INFANTS TAKING HEXAMETHYLENAMIN.

Talbot and Sisson write in the *Boston Medical and Surgical Journal* of April 3, 1913, on this subject. From their observations they feel that they can safely conclude:

1. That all children are capable of breaking down hexamethylenamin.

2. That they all consequently excrete formaldehyde.

3. That relatively large doses are often necessary before the excretion of formaldehyde takes place.

4. That, as pointed out by Jordan, "the more acid the urine the greater is the decomposition of urotropin and excretion of formaldehyde." Since it has been shown by other observers that the antiseptic power of urotropin is dependent, not upon the hexamethylenamin, but upon the presence of free formaldehyde, they can further conclude:

5. That urotropin should not be given with drugs that cause the urine to turn alkaline.

6. Finally, they believe that to insure the efficacy of the drug, specimens of urine after the administration of hexamethylenamin should always be examined for the presence of free formaldehyde.

RHEUMATOID ARTHRITIS.

Barr in the *British Medical Journal* of April 12, 1913, has this to say as to treatment:

The earlier the recognition of the disease the more successful the treatment. Our attention should be first directed to the primæ viæ, the teeth should receive scrupulous attention, and all sepsis should be eradicated; the acid fermentation in the stomach should be eliminated, and this is most readily accomplished by cutting off all saccharine and farinaceous articles of diet, and placing the patient for a few days on an abundance of red meat with plenty of hot water. Red meat produces ammonia, which neutralizes the sarcolactic acid in the muscles; then milk to which some sodium bicarbonate and chalk or lime water have been added, junket and cream. The sour-milk craze in this disease has fizzled out. Afterwards green vegetables and farinaceous food, except oatmeal; a fair amount of fat should be given, especially olive oil or cod-liver oil; at least an ounce of one of these oils should be given every night at bedtime. Bacon gravy, fat bacon, cream, butter or margarine are valuable adjuncts, but beef and mutton fats had better be eschewed. The patient should take a liberal allowance of table salt with meals. All acids and acid fruits, rhubarb, tomatoes, and asparagus should be avoided. When saccharoses are considered permissible, glucose and honey are better than cane-sugar or jams, but perhaps a little marmalade may be occasionally allowed. When the patient is improving, grapes, bananas, nuts, stewed prunes, and figs may be allowed; saccharin is better than sugar, more especially if the urine has become alkaline under treatment, and tends to deposit phosphates. Regarding drink, there is nothing better than pure water, especially when hot, weak tea, milk and soda water (containing about 30 grains of sodium bicarbonate to the pint), plain

barley water, and raisin tea. Avoid all sweet and acid drinks, wine and malt liquors. Regarding alcohol, Barr thinks the patient is better without any, but if for any particular reason a little is ordered it should be in the form of whisky, gin, brandy, sloe gin, or liqueur cognac.

To correct the acid fermentation and improve the motor function of the stomach a good combination consists of 30 grains of sodium bicarbonate, 10 grains of potassium bicarbonate, and 15 or 30 grains of aromatic chalk in a glass of milk, about half an hour before meals, and a double dose at bedtime; often smaller doses suffice. An excellent stomachic of calcium chloride, hydrochloric acid, and minute doses of the perchloride of iron is very useful after meals. A small cholagogue pill should be regularly administered to keep the bowels open; for this purpose an excellent mixture can be made with the sulphate, bicarbonate, and salicylate of sodium and licorice. The pancreas is also usually at fault, and to improve its action Barr often prescribes a capsule of holadin and bile salts about two hours after meals. In these cases the thyroid gland is usually too active, and so all preparations of iodine and thyroid should be avoided. Possibly suprarenal gland and pituitary extract might do good, as Dr. Blair Bell has shown that these secretions tend to retain the lime in the system, whereas the thyroid increases its elimination, but personally Barr does not care to prescribe such powerful drugs when milder remedies may suffice. It is imperative to get lime into the tissues, and to lessen its elimination, but herein lies our difficulty, as no matter how much is administered by the mouth it may be as rapidly excreted as it is absorbed, and so none may reach the tissues; but on the other hand the acidosis in the blood may be taking lime from the tissues as well as from the intestinal tract. In order to get the lime into the tissues there must be a liberal oral supply, and the blood must be kept very alkaline. For this he prescribes freely chloride of sodium and potassium, sodium bicarbonate, chalk, lactate of lime, and calcium glycerophosphates. If it be desired to get calcium rapidly into the tissues it may be given in a very dilute form subcutaneously, say a pint of sterile normal saline solution with 0.05 per cent of calcium chloride, and 3 per cent of syrup of glucose. If the calcium chloride be administered hypodermically in a concentrated form, it may readily produce gangrene of the skin and adjacent tissues. Iron is best administered in the form of underdone red meat and yolk of eggs; arsenic, potassium iodide, guaiacol, and a host of remedies commonly prescribed are worse than useless.

Leucorrhea should be treated with injections, and any infection of the urinary tract should receive attention. Here vaccines will often prove useful, and the same may be said for pyorrhea alveolaris.

General massage and the Aix douche improve nutrition, and are highly beneficial; the hot air and electric light baths applied to affected joints often give much relief, but can scarcely be looked upon as curative agents. When we have cured our patient we can send her or him to Egypt, Timbuctoo, or any health resort. Encourage the patient to take a fair amount of exercise short of fatigue when the disease has subsided, and to live a godly, righteous, and sober life in this present world.

THE ETIOLOGY OF HAY-FEVER.

The *Boston Medical and Surgical Journal* of April 3, 1913, contains an article by THEOBALD SMITH on this topic.

In recent years, since the development of our knowledge of anaphylaxis, many observers have considered hay-fever an anaphylactic reaction. Let us look for a moment at this reaction and see how it resembles and differs from toxic action. We know that we can rapidly accustom animals to increasing doses of true toxin. Horses can be so immunized as to stand many thousand times the initial fatal dose of tetanus toxin. The same is true of diphtheria and other toxins. When an animal receives a very minute dose of some ani-

mal or vegetable proteid and some weeks later a large dose of the same, harmless to a fresh control animal, it exhibits a group of symptoms which come on very quickly and may lead to death. Thus the guinea-pig which received an excessively minute dose of horse serum two weeks previously, will die if 5 Cc. of the same serum is injected subcutaneously, or much less into the peritoneal cavity, or as little as 0.1 Cc. intravenously. It cannot be immunized to this horse serum. It may become temporarily refractory after recovery from the anaphylactic shock, but it becomes susceptible again. There seems to be, therefore, a fundamental difference between toxin immunity and protein susceptibility or anaphylaxis. Both are immune reactions, but the latter is dangerous to the subject.

The current explanation of the anaphylactic shock is as follows: The original injection of proteid leads to the formation of an immune body (anaphylactic-reaction body) which, with the aid of the normal complement of the blood, tends, on a second injection of the same proteid, to disintegrate it—digest it, in other words—for subsequent reassimilation. One or the other of the component parts into which the proteid is disintegrated may be toxic to the organism and produce the train of symptoms called anaphylactic shock.

The difference between a toxic and an anaphylactic or allergic action (as von Pirquet has called it) is then fundamental. The toxin and antitoxin combine to form an inert substance. The proteid (antigen) is acted upon by an immune body (anaphylactic-reaction body) plus complement, and is disintegrated into fragments, one or more of which may be toxic and act as toxins before further disintegration has made them harmless.

In the guinea-pig receiving horse serum a second time in adequate dose, some toxic substance is set free, which acts upon the plain muscle fiber of the body. In the lungs it causes spasm of the muscular coat of the bronchi so that air cannot pass out or in, and the guinea-pig dies of asphyxiation. The lungs are found greatly inflated, and this inflation in the guinea-pig is taken as a reliable indication of true anaphylaxis.

The sudden onset of the symptoms of hay-fever after instilling the pollen extract or inhaling pollen powder has led the majority of writers recently to interpret the paroxysms as an anaphylactic reaction. Especially the asthmatic symptoms are suggestive. We are far from being in a position to settle this question at present, and only a few of the arguments which have been presented are given in this paper.

In the first place, Dunbar's claim to have produced an antitoxic serum which seems well substantiated militates against the view that anaphylaxis is dominant in hay-fever. On the other hand, the rapidity of onset and the apparent incapacity of the affected persons to become immunized speak for anaphylaxis. The reaction in the conjunctiva may be called out almost every hour and the attacks last six or seven weeks, or until the pollen disappears from the air. But we know of toxins now which act within one or two hours after injection, and we know that immunity to bacterial action may not be durable enough to last from one year to another.

Another line of argument favoring a toxic action in hay-fever is the absence of a refractory state in the individual. The individual (man or animal) treated with a proteid in large doses becomes insusceptible or refractory for a time. It seems as if the immune body (anaphylactic body) had been used up for the time being. In hay-fever, no refractory state has been observed either in the spontaneous or experimental cases. The individual remains sensitive throughout the season, and from hour to hour. Experimentally, Dunbar has been unable to produce passive anaphylaxis by transferring serum of the treated horses to guinea-pigs and injecting the protein. In true hypersensitiveness or anaphylaxis, a shock will result under this condition.

Now, there is another way of attacking the problem, by attempting to actively immunize patients who are subject to hay-fever. The serum, of course, only passively immunizes them, protects them only for a

certain length of time, but if we can inject the pollen toxin subcutaneously and produce such a condition as is produced in the horse for the production of the horse pollantin, then, if immunity occurs, we are justified in saying that we have not an antiphylactic phenomenon to deal with, but a pure and simple sensitiveness to toxins. This method of active immunization or vaccination has been tried in England and in Germany. Only recently an article appeared by M. Neisser on this subject. The pollen toxin is prepared and put into the eye in from 5 to 5000 reacting doses, the unit being that dose which produces marked hyperemia of the conjunctiva in sensitive persons. By injecting increasing quantities of the toxin subcutaneously into these 14 or 15 cases they have obtained certain results. Fully one-half of the cases were very much benefited, some slightly, and some not at all. They were, however, careful to make inquiries of a number of other patients who had not been treated, and they found that the season during which the experiments were made was such that fully one-half had a much easier time than the year before. These results are not entirely free from criticism, for the good results might perhaps have been obtained without the treatment. But Neisser and his coworker think that they began the treatment a little too late in the season. The patient should be immunized before he is exposed to the pollen grains in the spring of the year, if it is a June affair. Another time they mean to try immunizing much earlier and see if they cannot get a larger percentage of successful results. These cases are not to be considered actual cures because all of the patients had hay-fever, but the paroxysms were much milder and the patients were more comfortable.

From what has been said it will be seen that it is not quite possible to explain definitely hay-fever as an effect of pure toxins on the one hand, or of hypersensitiveness on the other. The latter explanation is the simpler and is currently accepted. We do not, however, know enough of anaphylaxis itself. There are many phenomena at present thrown together as anaphylaxis which need further analysis. It is also probable that in this disease the two phenomena are so associated that now one, now the other, predominates. Pollen protein may contain both hypersensitizing and toxic substances not yet separated from one another.

SCOPOLAMINE-MORPHINE-ATROPINE AS A GENERAL ANESTHETIC.

In the *Proceedings of the Royal Society of Medicine* for April, 1913, NORBURY says he believes that one may justly draw the following conclusions from the cases in his experience:

That scopolamine - morphine - atropine mixture has a field of usefulness as a general anesthetic in operations on diabetic patients, and especially so in amputations for gangrene associated with diabetes.

It is similarly useful in amputations upon very feeble patients, the subjects of chronic bronchitis, etc., or suffering from advanced disease of the circulatory system, and where it is of great importance to avoid "shock."

When employed alone it is of little use in cases in which complete muscular relaxation is essential, but in this connection it has its advantages as an adjunct to inhalation anesthesia: the patient being semiconscious at the time that the inhalation anesthesia is commenced, less anesthesia is required, shock is reduced to a minimum, and sleep is secured for some hours after the operation.

HAIRINESS OR HYPERTRICHOSIS AND ITS TREATMENT.

In the *Practitioner* for May, 1913, FRESHWATER writes on this subject. He points out that Boettger was the first to discover the depilatory action of the alkaline sulphides, and his depilatory is made by passing hydrogen sulphide gas through a quicklime paste, until the mixture is saturated and has become leaden-gray in color. More recently, Brayton has advocated a similar paste consisting of calcium

sulphohydrate made by heating together plaster of Paris and granulated wood charcoal. Either of these is suitable for the removal of fine hair.

Calcium sulphide and anhydrous barium sulphide have a less intense action than sodium sulphide. Ammonium sulphide is an excellent liquid depilatory and would be employed more frequently but for its unpleasant odor, all attempts to disguise it being unavailing. The following are two formulæ:

(1) REDWOOD'S.

℞ Sol. bar. sulphid. concentrat.
Amyli q. s. ut f. pasta.

(2) DUHRING'S.

℞ Barii sulphidi, ʒiij;
Pulv. zinc. oxid.,
Amyli, ää ʒj.

Duhring's formula is one of the best, but the sulphide should be fresh, otherwise its action is unsatisfactory. At the time of application, sufficient water should be added to make a paste, which is then spread over the hairy part and permitted to remain two or three minutes or until a sensation of heating or burning is felt. It is then quickly removed by scraping with a wooden spatula, and the skin is thoroughly washed with warm water; after drying, the skin should be covered with some cold cream.

In prescribing a depilatory, the patient should be informed that its action is only temporary, and that it must be repeated after a variable period. Further, when first applied, it should only be allowed to remain on the skin a short time, in order to ascertain the tolerance of the skin to its action, even if the removal of hair is incomplete.

Hydrogen Peroxide.—The bleaching properties of peroxide have long been used for changing the color of the hair, and advantage may be taken of this in connection with the growth of superfluous hair on the face of women. It is usual to employ it in those cases in which the hair is perceptible but too fine to admit of its removal by electrolysis; if used freely and repeatedly, a very material improvement in the appearance will be produced in a short time. Besides its bleaching properties, it has a destructive action on fine hairs, which after a time become brittle and break off, producing a still further improvement in the appearance.

Another advantage is a certain retarding influence which it exerts on the growth of hair, which after a while tends to become weaker, and in some cases to stop altogether. It is a harmless remedy for home use, can be used without danger, and its results are good. It is of especial value to brunettes with fine dark down on the upper lip. It may be employed in a cream for night use, or dabbed on while dressing in the morning. After a few applications the hair is bleached white, and its occasional use afterward is all that is necessary.

Merck's perhydrol is a good preparation of peroxide on account of its purity, but it should be diluted down to 10 volumes to begin with. It is expensive, and the ordinary peroxide is equally efficacious for dabbing on, but not if a cream is required.

The formula for a cream is as follows:

Perhydrol (Merck), ʒijss.
Adep. Lanæ anhyd., ʒvj.

It is nothing like so rapid in its action, and does not keep long, but is less troublesome to apply. To obtain a quick result, it is necessary to use the plain peroxide and to clean the skin with a mixture of ether and spirit, in order to remove greasy substances from the hair, which prevent the peroxide coming into close contact.

Another method of applying peroxide, suitable for large areas, is by means of sodium peroxide soap, or pernatrol soap, which is obtainable in various strengths ranging from 2½ to 20 per cent. It should be left on the part for from five to twenty-five minutes, according to the tolerance of the skin. It is a suitable method for bleaching the hair on the arms and legs.

Pumice-stone.—Of the several palliative methods of treatment at our disposal, this is one of the simplest and by no means the least efficacious. It can be carried out at home, and is not at all harmful. The process is as follows: To commence with, the

hair on the chin or lip should be cut short or shaved. A piece of pumice-stone without rough edges is selected, the artificial pumice-block being the best for the purpose, and rubbed gently over the part to be treated against the direction of the hair growth, for a few minutes twice a day; the friction should not be so severe as to damage the skin, and afterward a little cold cream should be rubbed in. This should be carried out for six months, during which time the part will be free from hair. A rest of a month is then enjoined, in order to see the effect produced on the hair growth; in a large number of cases it will be noticed that the hair growth is weaker—that is, where previously thick pigmented hairs grew, now finer hairs appear.

Another six months' rubbing is ordered, and at the end of this period, in some cases, the hair is practically destroyed, while the rest show a marked diminution in number and size of the hairs. After this an occasional rubbing will be sufficient to keep the growth invisible. Schwenter-Trachler has observed favorable results in 252 cases, over a period of ten years. There is no doubt that this simple method has some permanent effect, and should be tried when other means of treatment are not available.

TREATMENT OF GOITRE BY IODINE ABSORPTION FROM THE SKIN.

TYTLER writing to the *British Medical Journal* of April 19, 1913, says with reference to the inquiry of Major Lawson in the *British Medical Journal* of March 29 that for the last five years he has used the following method in the treatment of goitre: A piece of lint large enough to cover the growth and the skin for three or four inches beyond is soaked in a lotion consisting of one drachm of iodine tincture in eight ounces of water applied to the neck at bedtime and left on till morning. If a stronger solution is used it produces inflammatory reaction and prevents absorption. Dr. Tytler states that he has employed this plan in many cases, but that only three have continued long enough to produce a satisfactory result. They were all young men, aged eighteen years and upward. Two were out-patients, and over two years elapsed before the swelling materially diminished. In the one private patient the swelling was reduced two inches in eight months. The difficulty, he finds, is to get patients to persevere with the treatment.

A NOTE ON THE TREATMENT OF ERYSIPELAS BY BUTTERMILK.

ARNOLD makes a remarkable communication to the *Practitioner* for May, 1913, on this subject. He well says that no medical man with any large experience of erysipelas is likely to express unqualified satisfaction with any of the traditional methods of treating the disease. The multiplicity of the remedies suggested is strongly suggestive of a lack of therapeutic power in, at any rate, the majority, and goes far toward relegating it to the class of opprobria medicorum. In these circumstances a paper such as that of Dr. Lawrance in the March number of the *Practitioner*, on the treatment of erysipelas by the salicylate of iron, is likely to be read with a good deal of interest and to lead to a thorough trial of the method.

For many years past Arnold has used, in the treatment of erysipelas, a simple remedy which he believes to be as certain and even more rapid in its abortive action on erysipelas than the salicylate of iron as described by Dr. Lawrance. The remedy is buttermilk, which he orders to be applied on soft rags—buttercloth is excellent for the purpose—which are kept constantly wet with the remedy.

About seventeen years ago he had under treatment a girl of nineteen, suffering from erysipelas of the face and scalp. She was ill for several weeks, and had a great deal of pain, frequent relapses, and so on, but eventually recovered, and he sent her to the seaside to recruit. While there she very much overtaxed her strength by a long walk, and came home in a condition of exhaustion. The next day the erysipelas was back again in the face and scalp, the

temperature ran rapidly up to 104°, and she suffered very severe pain. While waiting for the arrival of medical help, a friend suggested that some buttermilk should be procured and applied freely, saying that she had heard a farmer's wife say that buttermilk was a splendid remedy in erysipelas.

The suggestion was followed; so buttermilk was got and rags soaked in it were applied to the inflamed surface. The pain was immediately relieved and quickly removed altogether. The temperature remaining high, however, it was suggested that, in addition to the local application, she should drink buttermilk. She did so, with the result that the temperature dropped almost at once from 104° to 99°. The inflammation very rapidly subsided, and the patient was practically well the next day. On returning from the seaside, the patient came to see Arnold, and gave him a clear account of the whole experience. The evidence seemed good enough to justify a trial of buttermilk in any subsequent case.

The opportunity occurred in a case of facial erysipelas in a man, who had had a severe and obstinate attack about two years previously. There was an extensive inflammation, with high temperature and great pain, when Arnold was called in. He ordered buttermilk to be applied freely and continuously. The spread of the inflammation, which had been rapid up to that time, was immediately checked and the pain entirely relieved. The whole morbid process was aborted, and the next day the patient was practically well.

He does not think that he need give other cases in detail, but further states that since that time—some seventeen years ago—he has treated every case of erysipelas he has had to deal with by this method. The application must be very free, the cloths not being allowed to dry, but being kept constantly wet with the buttermilk. This method has given him quite uniform results; the spread of the inflammation is immediately checked on the application of the buttermilk, whatever the stage of the erysipelas; the pain disappears, and the whole morbid process rapidly aborts.

Arnold asserts he can find no allusion to this method of treating erysipelas in the Medical Digest, and he has not met any medical man who was acquainted with it, though it would appear to be an old country remedy, as, since first learning of it, he has found that it is fairly widely known to farmers and their wives. An interesting question well worthy of investigation is whether the undoubted abortive power of the buttermilk is due to the presence of beneficent microörganisms therein, to the antiseptic action of its lactic acid, or, perhaps, to the two combined?

INTRAMUSCULAR INJECTIONS OF MERCURY (EMULSION) IN THE TREATMENT OF SYPHILIS OF THE NERVOUS SYSTEM.

CAZENAVETTE, in the *New Orleans Medical and Surgical Journal* for May, 1913, tells us the results obtained in the treatment of a number of cases of syphilis of the nervous system, by an intensive form of treatment used by Professor P. E. Archinard for nervous diseases in the service at the Charity Hospital, have been so gratifying that, with his kind permission, he wishes to present the following short paper:

Mercury has been, and is still, our best weapon against the ravages of the spirochætæ, and it is of value in all stages of syphilis. Although remarkable results have been obtained by a single dose of salvarsan, most writers believe to-day that in the majority of cases it is not only necessary to repeat the injection of salvarsan two or three times at intervals of a few weeks, but it is further necessary to follow this by the administration of mercury, in order to insure the proper destruction of the spirochætæ and cure the disease. The advent of salvarsan has helped to strengthen the belief in the therapeutic possibilities of mercury.

Mercury has stood the test of time, has proven its worth, and in anticipation of the time when some other drug, working on the lines of salvarsan, shall have evolved from the laboratory of experimental therapeu-

tics, let us cling to and do homage to mercury.

In the treatment of syphilis of the nervous system it is often of great necessity to produce rapid mercurialization in order to stay the ravages of the disease as promptly as possible.

To this end the method of administration which appeals most strongly is the intramuscular injection method, because it affords an accurate means of administration of the drug, because it is at all times under the control of the physician, eliminating such factors as forgetfulness or indifference on the part of the patient, and furthermore because it affords a means by which the intensity of the treatment can best be controlled.

The intensive form of treatment used is composed of the following formula:

Hydrargyri biniodidi, gr. v.;
Potassii iodidi, gr. v-x;
Olei olivarum, ℥j.

Macerate first two and add a few drops of water. Then add oil and sterilize thoroughly. Dose: From 10 to 20 drops, or from 1/10 to 1/5 grain of biniodide of mercury.

A modification of the above formula follows:

Mercury biniodide, grs. vijss;
Castor oil, ℥jvss;
Olive oil, q. s. ad ℥j.

Place in porcelain dish and keep on water-bath, and when clear sterilize thoroughly. The dose is from 10 to 20 drops, or from 1/10 grain to 1/5 grain of biniodide.

The injections were made by means of a hypodermic syringe, a needle of large caliber being substituted for the ordinary hypodermic needle. This is necessary, because it is impossible to suck up the oil through the ordinary needle. The large caliber needle should be long enough to reach through the skin and subcutaneous fat, as it is essential to enter the muscle. It is needless to add that the utmost care should be taken in sterilization of the needle before use.

The site of the injections has been in the buttock well above the tuberosity of the ischium, the other buttock serving for alternate doses.

Although pain and local irritation have been the chief objections to this form of treatment, the patients treated have not complained of any unusual pain during or following the injection, and have all borne the treatment well.

THE VARIOUS FORMS OF FIBROSITIS AND THEIR TREATMENT.

LUFF in the *British Medical Journal* of April 12, 1913, states that in his opinion a saline aperient should always be given at the onset of an attack of acute fibrositis, and repeated as necessary. If the attack is a severe one, confinement to bed may be necessary, and it is important to recognize the beneficial influence of rest in such cases. For severe attacks of lumbago and intercostal rheumatism firm strapping with the brown-holland strapping plaster secures the necessary local rest of the affected muscles. In all cases of brachial fibrositis the arm should be carried in a sling and should be moved as little as possible during dressing and undressing.

In the treatment of the different forms of fibrositis salicylates are of little curative value, as they do not exercise the same specific action as in acute rheumatism. Aspirin is of decided use for the relief of pain in severe cases, but it should only be given with that object. It acts better than sodium salicylate, owing to the fact that the introduction of the acetyl radicle increases the analgesic action of the salicylic acid. It probably also exercises a beneficial effect in cases of abnormal intestinal fermentation. Perhaps the best method of administering this drug for the relief of pain consists in giving 10 grains of aspirin with 6 grains of pyramidon in a cachet every four hours. Potassium iodide is, in Luff's experience, the most valuable drug in the treatment of fibrositis. It seems to exercise a direct effect in removing the hyperplasia and serous exudation in the fibrous tissues. It should always, if possible, be given in full doses of 10 or 12 grains, and should be combined with tonics, such as nux vomica or the compound glycerophosphate syrup.

If the iodide produces severe symptoms of iodism, one of the organic iodine compounds may be tried. Of these Luff has found iodipin, in the form of tablets, extremely useful.

Fibrolysin is a chemical combination of thiosinamin and sodium salicylate, for which the claim has been put forward that it has a softening effect upon all forms of pathological fibrous tissue. In a former paper Luff reported on the use of it in a somewhat limited number of cases of fibrositis, and then gave a somewhat guarded favorable opinion as to its being of use in properly selected cases. He now proposes to lay before us the results of an extended experience of the use of this drug, an experience which, he may at once state, does not support the somewhat favorable opinion that he formerly expressed. He has obtained the results of its use in 83 cases of various forms of fibrositis, some of which he treated throughout, but in the majority of which he is indebted to careful reports furnished him by the various medical men who, on his advice, carried out the treatment. They were all carefully selected as cases likely to be favorably influenced by the use of fibrolysin. In 18 out of the 83 cases the use of the drug had to be discontinued, owing to the injections causing rise of temperature, malaise, nausea, headache, and, in some cases, palpitation, vertigo, tendency to syncope, severe general pains, and a purpuric rash. This leaves 65 cases in which a full course of forty injections of fibrolysin, together with massage of the affected parts, was employed. No good whatever resulted in 46 of the cases; in all of the cases there was some improvement, which was permanent in 10 and transient in 1; in 8 of the cases there was permanent cure. So that the numbers converted into percentages are: No benefit, 71 per cent; some improvement, 17 per cent; cured, 13 per cent.

In every one of the cases of rheumatoid arthritis and other forms of infective arthritis in which, after complete arrest of the arthritis, a full course of fibrolysin was used in the endeavor to reduce or remove the fibrous thickenings around the joints, no improvement whatever resulted. Similarly in all the cases of Dupuytren's contraction of the palmar fascia that were treated no benefit resulted. The eight cases that were cured comprised four of diffused or localized fibrositis with nodules, three of fibrous thickenings and adhesions around a single shoulder-joint, and one of severe thrombosis of both femoral and external iliac veins, with thickening of the walls of the veins. In this last case complete absorption of the thrombi and of the thickenings of the venous walls resulted, but massage was not resorted to until after complete disappearance of the thrombi.

From these results it appears that fibrolysin has a very limited use, and one cannot avoid the inference that the claims that have been put forward for this preparation must be considered extravagant.

For the complete dispersal of the indurations in most cases of fibrosis, and certainly in the severer cases, local treatment must be adopted. This may best be considered under the following headings: External applications, heat and electrical treatment, massage and exercises, surgical treatment.

In the early stages of an acute fibrositis hot fomentations are useful. Afterward one of the best external applications in Luff's experience is a mixture of equal parts of chloral hydrate, camphor, and menthol. These three substances form a liquid when well rubbed together. This liquid should be painted over the painful area, and then be gently rubbed in with the fingers. Some patients find the cold sensation produced by the menthol objectionable; in such cases the menthol may be omitted and equal parts of chloral hydrate and camphor employed, which also form a liquid when rubbed together. Another useful external application is to paint the painful area with tincture of iodine, and then to apply a hot linseed poultice or a very hot fomentation. The heat converts the iodine into vapor, which exercises the anodyne effect, and, probably by absorption, directly acts on the affected fibrous tissues. In the latter stages the aconite, belladonna, and chloroform

liniment applied on lint is frequently most beneficial. In cases of a very localized fibrositis, counter-irritation is sometimes of great use, especially in the form of the thermocautery.

In localized forms of fibrositis, and especially where fibrous deposits occur—such as in lumbago, thickening of the ligamentous and fibrous structures, surrounding or entering into the composition of joints, deposits in muscles, tendons, and tendon sheaths, and in chronic villous synovitis of the knees—the most effective form of local treatment that he is acquainted with is the employment of heat followed by ionization of the affected part. This treatment has a very remarkable effect in causing the absorption of thickened fibrous tissues. Heat increases the supply of arterial blood, and so causes a state of active congestion, stimulates leucocytosis and metabolism, lowers blood-pressure, causes diaphoresis, relieves pain, and enhances the effect of the ionization that is to follow. If heat is to be applied to the entire body, the electric light cabinet bath is the most convenient form, but in the treatment of localized forms of fibrositis it is preferable to concentrate the heat on the affected part only, and Luff asserts he is confident that far better results are obtained from the employment of dry radiant heat than from the employment of heat alone. C. F. Bailey considers that the ideal type of radiant heat should be as nearly as possible like sunlight, and should give a spectrum ranging from the ultra-red to the ultra-violet. This type of spectrum can apparently only be obtained from lamps of a very high candle-power, such as the so-called leucodescent radiant heat apparatus, which consists of a single 500-candlepower lamp in a funnel-shaped projector lined with a reflecting surface. The method of applying the heat is to sway the lamp slowly backward and forward over the affected part for about twenty minutes. It must be applied directly to the skin, and anything like a severe burning sensation should be obviated either by the temporary removal of the lamp or by brushing with the hand that part of the surface which is being treated. When the lamp is switched off, the part feels burning hot to the touch and the surface is red and mottled from vascular dilatation. If such radiant heat alone is used, it very definitely relieves pain, softens fibrous indurations, and causes improvement in joints and their surroundings as regards improved flexibility and reduction in size. These results are, however, considerably enhanced by subsequent ionization.

The exposure to heat should be immediately followed by ionization with iodine ions, which, in Luff's experience, are more effective than other ions on account of their solvent action on fibrous thickenings and deposits. The iodine is introduced into the affected tissues from a 2-per-cent solution of lithium iodine to which sufficient liniment of iodine has been added to give the fluid a sherry color, and so insure the presence of an excess of iodine. Pads of lint sixfold thick are soaked in the hot solution and applied to the part to be treated. A copper chain-mail electrode is then spread over the pad and bandaged on, leaving the connection exposed, which is then attached to the negative pole. The positive pole is similarly connected to another pad soaked in a weak solution of common salt or of lithium carbonate. Another method, though not so efficacious, in Luff's opinion, as the employment of lithium iodine, is to paint the skin of the affected part with iodine liniment and apply a pad soaked in a weak solution of lithium carbonate with the electrode connected with the negative pole, the positive being applied as before. Th strength of the current that should be employed varies with individual patients, but should range from 15 to 40 milliamperes. The ionization lasts twenty minutes, and should be repeated daily if the skin will stand the treatment, otherwise it should be used on alternate days. Many cases improve very rapidly from the first, but in severe cases a course of daily applications for four weeks is required. While the ionization treatment is being carried out it is very important that the administration of potassium iodide by the mouth should be

continued. As C. F. Bailey has pointed out, any iodine compounds lying in or circulating through the affected tissues are broken up by the current and locked up in the tissues temporarily, instead of being carried through the blood-vessels and excreted. In addition nascent iodine ions are much more energetic than when they combine into solution non-iodized salts; also the general migration of all kinds of ions, which takes place along the course of the current, may produce an effect of commotion in and stimulation of the tissues which is beneficial.

In cases of acute fibrositis, especially in acute lumbago and painful affections of the knees, shoulders, and elbows, it is advisable at the first two or three sittings to employ a 2-per-cent solution of sodium salicylate in place of the lithium iodide, in order to produce immediate relief of the severe pain. The salicyl ion is introduced into the painful region, and it is remarkable how rapidly it will relieve the pain, just as salicyl ionization rapidly relieves the pain of severe neuralgia and some forms of neuritis.

In cases of chronic villous synovitis of the knees this combined heat and ionization treatment is most effective, and in all cases gives the most satisfactory results.

Doubt has sometimes been expressed as to whether actual penetration of ions into the affected tissues occurs during ionization, but the experiments of N. S. Finzi conclusively prove that certain ions penetrate into the tissues of joints and the subcutaneous tissues. In addition it has been shown that strychnine applied at the positive pole, or potassium cyanide at the negative, rapidly kills an animal under experiment with all the characteristic symptoms of the respective toxic substances. Moreover, it is quite easy to demonstrate the presence of iodine or lithium in the urine after respective ionization with those substances.

Some observers have stated that the chlorine ion is quite as efficacious as the iodine ion, and is less caustic, but Luff's experience is that the iodine ion is more effective, and he has never met with any bad effects from its causticity.

It is a matter of common experience that the improvement started by a short course of heat and ionization treatment will continue to progress for some days after the treatment is left off. This is probably explained by the ions forming with the colloids of the animal tissues a sort of condenser, which is discharged by degrees. The ions therefore remain for a certain length of time at the place of their introduction, so that this region remains for several days as a kind of local medicated bath the therapeutic power of which is considerable. It may therefore be claimed that ionic medication is founded on a truly scientific basis, in that the ions exert a direct therapeutic effect, that they are for a time localized in the affected tissues, and that they are afterward slowly and gradually liberated.

In cases of lumbago the static wave current may be substituted for ionization. F. H. Humphris records excellent results with this form of treatment. It produces a local vibratory effect, and muscular contraction takes place, so that the wave current tends to remove the infiltration by squeezing out the serous exudation from the affected tissues, and thereby relieving the pain. From Luff's experience in a number of cases that he has had successfully treated, he thoroughly recommends the employment of local heat followed by the use of the static wave current.

Massage is very useful in the later stages, but it should only be employed when it causes no pain. The manipulations should be very gentle at first, so as to promote removal of exudation and to relieve the tension. Afterward more vigorous massage is most efficacious in dispersing the indurations and fibrous thickenings, and in removing the stiffness of the affected parts. General massage should not be employed, but the tender and affected areas should be carefully marked out for treatment. Massage should not be used to affected joints, but only around them, so as to improve the circulation in their neighborhood. Luff

asserts he has frequently seen the most disastrous results to joints from their overzealous manipulation by masseurs and masseueses, as such treatment only increases the inflammation and bruises the synovial fringes. The same remarks apply with equal force to acute affections of the brusæ and tendon sheaths, and to fibrositis of nerve sheaths until the acute affection has entirely subsided.

During the very painful stage of muscular rheumatism as complete rest as possible of the affected muscles must be enforced, but later on exercises of the muscles are of great benefit. Either light dumb-bells or Indian clubs, of from one pound to two pounds in weight, should be employed, and such movements are to be performed as will bring the affected muscles into action. The exercises should be performed on rising in the morning, and should not occupy more than from two to fifteen minutes. After the exercises a cold or tepid bath should be taken, and the skin be briskly rubbed with a rough towel.

In cases of chronic subcutaneous fibrosis in very fat people (adiposis dolorosa) massage is quite ineffective, and often unbearably painful. In such cases it is essential, first of all, to get rid of the superabundant fat by means of a strict diet, and by the administration of thyroid gland.

GONORRHEAL ARTHRITIS AMONG NEGRO LABORERS ON THE PANAMA CANAL.

BAETZ in the *Journal of the American Medical Association* of April 8, 1913, has this to say about the treatment of gonorrheal arthritis:

In the thorough treatment of gonorrheal arthritis of negro patients he was placed at a twofold disadvantage. As far as the patients' inability to understand the need of an eradication of the disease focus is concerned, conditions are, of course, the same as in syphilis. They are personally handicapped, moreover, by the fact that in order to eradicate a gonorrheal focus, the cause of joint metastasis, special skill and training with ample time and facilities are necessary. It is a task for the better class of genito-urinary specialists. In a commercial undertaking, like the building of this canal, the employer cannot be expected to furnish such treatment in all cases, if only for the reason that the patient himself would rebel against the loss of time and pay. The main aim then was to refit these men in as short a time as possible for their labors on the canal. I found that nothing gives better results in these cases than to place the patient in bed, administer a urinary antiseptic, usually hexamethylenamin, aspirate the pus from the most severely involved joints, splint and bandage them, and give an eight-strain gonococcus stock vaccine hypodermically (not intramuscularly).

Three years ago the results of vaccine therapy in metastatic gonorrhea were very doubtful, owing to the small dosage then advised by authorities. For the past two years he has been giving four injections of fifty million, one hundred million, two hundred million, and four hundred million respectively, with intervals of one day between doses. While in some cases of gonorrheal arthritis a sufficient number of antibodies will develop to permit recovery without vaccine treatment, in most cases the patient will suffer far less pain and get well much more rapidly with the treatment. Not infrequently the terrific pain, which can be dulled only by opiates, is abolished in six hours following the first injection of vaccine. But the most brilliant results obtained with vaccine are in those very acute cases in which organic joint changes have not taken place as yet, and in which sufficient antibody cannot be manufactured. The suffering in these cases can be compared only with renal or gall-stone colic.

An example of a case of this kind occurred last spring, when, through some oversight, the vaccine supply was exhausted and a new supply not furnished. The patient had a temperature of 100° to 103° F. for twelve days after admission, in spite of all treatment. Morphine sulphate had to be given frequently in ¼-grain doses hypodermically to dull the severe pain as much

as possible. Intracellular gonococci were found in the pus aspirated from one knee-joint on the third day. The Wassermann test was negative on the fourth day. On the thirteenth day following admission, a supply of stock vaccine was received and fifty million killed bacteria were given immediately. The result was extremely gratifying. That night the pain ceased and the temperature fell to normal for the first time since the patient's admission to the ward. The temperature rose again to 100° F. the next day, but the pain did not return. On the third day of vaccine treatment a second dose of one hundred million bacteria was given, with the result that the next morning the temperature was normal and remained so. The effusion absorbed rapidly. On the ninth day of treatment, after having received a total of 350,000,000 killed bacteria in three doses, the patient said he felt perfectly well and requested to be sent back to work.

Keyes, Jr., in his admirable text-book on genito-urinary diseases, 1911 edition, states that 75 per cent of gonorrheal arthritides should be markedly improved by vaccine treatment. This same author also speaks of the brilliant results sometimes obtained in gonococcus septicemia. He warns his readers not to expect the impossible of vaccine therapy in cases in which organic bone and tendon changes have already taken place. Fortunately for the patients he seldom encountered gonorrheal osteoarthritis or septicemia. A word of caution may not be amiss here, calling attention to the fact that some vaccine on the market is poorly put up and probably carelessly prepared. Only the best can be good enough in specific medication.

All of the cases of gonorrheal metastasis in this series recovered without impairment of function. The total number of days in the hospital of uncomplicated cases was 672; the average stay per man was twenty-four days. That the treatment just outlined is efficient temporarily is shown by the fact that during the year there were no re-admissions. It is possible that the Bier hyperemic treatment used in conjunction with vaccine would give still better results. The hypodermic administration of the patient's own joint fluid, sterilized, is another form of treatment that may be worth trial, as it is possible that the tendency to recover in acute gonorrheal arthritis may be due to an antitoxin or antibody to be found in the joint effusion.

CEREBROSPINAL MENINGITIS IN INFANCY.

In *American Medicine* for June, 1913, FISCHER writes that when the diagnosis is positive and proven by the presence of the diplococcus intracellularis in the cerebrospinal fluid no time should be lost, and at least twenty to fifty cubic centimeters of Flexner's antimeningitis serum should be injected intraspinally.

In Fischer's practice he has found that it is better to withdraw as much of the infected cerebrospinal fluid as possible by lumbar puncture. In some cases fifteen cubic centimeters were obtained, while in other cases twenty-five to thirty cubic centimeters were aspirated. With the needle left *in situ* he immediately injected the Flexner serum, thus replacing the infected serum by the Flexner serum. The temperature, the pulse, the stupor of the child, the appetite, the restlessness, the constant moaning, and the general condition are all factors that must be studied to note an improvement due to the antimeningitis serum. If the symptoms do not modify within twenty-four hours after the injection of Flexner serum, then the injection must be repeated. Thus the daily aspiration followed by an immediate injection has been necessary for ten days, and in a severe case twenty-one days were required to modify the toxemia and produce a cessation of this active inflammatory process.

Antipyretic measures such as cold packs, ice-bag on the head, and tub baths are indicated. Cupping of the neck and spine sometimes relieves internal congestion.

Eliminative treatment consists in cleansing the gastrointestinal tract with the aid of citrate of magnesia or calomel. When

high fever exists, flushing the rectum and colon with a cold soap-suds enema will be found useful.

TREATMENT OF UTERINE HEMORRHAGE.

PFAHLER (*American Journal of Obstetrics,* May, 1913) in writing on this subject concludes his paper as follows:

Roentgenotherapy is the method of choice for the control of hemorrhage in patients approaching the menopause, in whom carcinoma can be eliminated.

It is not the method of choice in patients under forty years of age.

It can be recommended in all cases at any age in which operation is contraindicated.

For the differential diagnosis, in order to determine the indications for this treatment, special skill in gynecology is required; and for the proper administration of the rays, special training in Roentgen technique. It is possible for a gynecologist to become a roentgenologist. It is also possible for a roentgenologist to become a gynecologist, but it is very unlikely that either one will master both. Therefore, Pfahler believes that each case should be examined by a gynecologist, and treated by a roentgenologist.

AFTER-HISTORY OF GASTROENTEROSTOMY FOR PEPTIC ULCER.

BOURNE (*British Medical Journal,* March 1, 1913) records the after-history of cases in which gastroenterostomy had been performed for ulcer of the stomach or duodenum. In the more recent cases there was an interval of at least nineteen months between the operations and the inquiry as to the present condition of the patient, while in the older patients more than five years had elapsed. Of the 92 cases of the series 68 have been traced. Of these, three have died in the interval. The total mortality of the operation, plus that of the uncured ulcer after operation, is 10.9 per cent. As to the results, nearly one-half the cases were in no way bettered. The operation was markedly successful in 43 per cent and hopelessly bad in 38 per cent. The older the patient the better the outlook. The figures show that the result of operation depends very largely on the time after food at which pain occurs. This varies from immediately after the meal to one and a half hours, and in proportion as this interval is long, so is the prognosis good. Cases of duodenal ulcer as a rule do much better after this operation than cases of gastric ulcer. The degree of hyperchlorhydria is of importance, cases showing a total acidity of 0.2 to 0.3 per cent reacting better than do those of a lesser percentage (0.12 to 0.19). Thus does gastroenterostomy, by drainage of the stomach, bring about two essential conditions for the cure of ulcer, namely, rest and normal acidity. Cases in which the ulcer is not found at operation do badly. Failures may be due to recurrence, or failure to heal of the original ulcer, or the formation of a jejunal ulcer, whilst apparent relapses may be due to adhesions or to carcinomatous degenerations.

THE INTRAMURAL SPREAD OF RECTAL CARCINOMA.

COLE (*British Medical Journal,* March 1, 1913) after calling attention to the fact that operative measures for the eradication of cancer must be planned according to the pathological findings, states his result in the study of twenty cases of rectal carcinoma, in eighteen of which the bowel was removed by operation. The operation in thirteen cases was radical abdominoperineal as described by Miles. In three cases the malignant disease was situated above the pelvic colon. The length of bowel removed in these sixteen cases was from 9 inches to 23 inches. In two cases a local resection was practiced.

The growth in every case was an adenocarcinoma. The favorite site of origin in cancer was in the anterior lateral wall, from which point the growth extended around the bowel, a partial indication of its progress being afforded by ulceration, which begins

to occur at a very early stage. Carcinoma spreads more widely in the submucous coat than is indicated by the surface ulceration. The muscular coat is invaded to a greater extent.

The tendency of the stroma of the growth is to progressive contraction, and the pull thereby communicated to the deeper layers of the adjacent but uninvolved bowel wall produces that eversion of the margins of the ulcer which is such a marked feature of these growths. Eversion of the edges of malignant ulcers in other situations may equally be a surface indication of subjacent infiltration greater in extent than the area of ulceration. Puckering of the peritoneum is another phenomenon due to the contraction of the stroma, and it is possible that the first stage of invagination may be brought about by the same means.

The pathological findings indicate the wide diffusion of carcinoma even though the obvious lesion be small and point the necessity of going far beyond the usual one or two inches above and below the seat of invasion.

THYMUS DEATH IN THE NEW-BORN.

DAVID (*American Journal of Obstetrics,* May, 1913) reports the case of a child who died in a spasm of dyspnea twenty-four hours after birth, exhibiting nothing abnormal in the neck and thoracic regions. The post-morten examination showed a greatly enlarged thymus in both lobes. The embryology and histology of the gland indicate that it is intimately concerned with the blood-making and metabolic processes of the fetus. Recent studies in relationship existing between the placenta and the thyroid gland suggest that the large thymus in the new-born must share in various disturbed conditions of maternal and fetal metabolism. In abnormal states it is reasonable to suppose that it adds a toxin to those formed in the placenta and in the ductless glands of the fetal body.

A possible reason for its sudden enlargement after birth may be found in the measures sometimes taken to establish respiration in the new-born. The most simple and universally employed method consists in folding and unfolding the body of the child in such a manner as to encourage the circulation of the blood through the lungs and thorax. A delicate lymphatic organ, like the thymus, composed of lymph follicles and with a very rich blood supply, might easily become surcharged with blood during this manipulation, and its sudden engorgement through mechanical pressure might bring about death.

These suggestions are based, first, upon analogy between altered conditions of other ductless glands of the fetal body and sudden death; and secondly, on reported results of treatment addressed to the relief of mechanical pressure.

THE PATHOGENESIS OF SALVARSAN FATALITIES.

WECHSELMANN (*Urologic and Cutaneous Review,* April, 1913) doubts as to whether the cerebral symptoms of salvarsan fatalities making up the clinical picture really constitute its essential feature. In view of the fact that in all the fatalities coma appears prominently in the foreground, he directed his efforts toward the investigation of the uremic phenomena. A prominent characteristic of uremia is its tendency to present strange and unexpected manifestations. Professor Loeb found urea in the spinal fluid in the proportion of 0.5 gramme to the liter, and marked increase of rest nitrogen in the blood. Though this accumulation of nitrogenous products cannot be considered as absolutely indicative of uremia, it is certainly an expression of kidney insufficiency. The insufficiency of kidneys, and not hypersensitiveness of the brain, is the point of the entire question of salvarsan fatalities. Wechselmann considers it evident that in intravenous injections of salvarsan the overburdened organ is the kidney and not the brain. The largest quantity of salvarsan disappears rather quickly from the blood. The blood is not subjected to elimination because all its water is associated as hydration-water

with the colloid which is here present. Conversely, a salt solution disappears quickly from the circulatory system because it contains free water. Saynisch has shown that in so short a space as an hour after the injection arsenic could no longer be demonstrated in the blood. The kidneys also tend to free themselves from foreign substances as quickly as possible, and possess much less tolerance to such than to the physiological urinary constituents. Also immediately, or at least in a few minutes after the injection, one may, by means of Abelin's test, demonstrate salvarsan in the urine—indeed, its entire elimination is accomplished in five or six hours. As a rule the kidneys easily take care of this extra burden, and albumin is rarely found. In general the syphilitic kidney bears salvarsan well; indeed, we even have reports of improvement and cure of syphilitic nephritis, and this, too, in instances where mercury has failed. But this result is not without its exceptions. In literature the salvarsan fatalities frequently occur associated with anuria or suddenly appearing albumin.

Schlayer has shown that there is a fundamental difference in the action of arsenic and of mercury on the kidneys. Mercury belongs to the substances typified by chromium, which produce a pronounced tubular nephritis. Therefore in the beginning there is a good secretion with completely normal function of the vessels notwithstanding excretion of albumin and the presence of large numbers of casts. After a rather lengthy existence of the nephritis there gradually comes a diminution in the capacity of the renal vessels to dilate and with it a decrease in diuresis. In sharp contrast to the above is the group of toxic nephritides, such as those produced by arsenic or cantharides; these cause a vascular nephritis. In this group there occurs, even after minimum doses, a marked impairment of the renal vessels' power to dilate as well as to contract, with accompanying suppression. In such cases there may be neither albumin nor casts, but because of the effect on the blood-vessels marked impairment of the renal function or even complete suppression. In connection with this clinical picture there may be an anatomical change in the kidney so slight as to excite no attention on post-mortem examination.

PERFORATING ULCERS OF THE STOMACH AND DUODENUM.

Morley (*Practitioner*, June, 1913) reports upon 112 cases admitted to the Manchester Royal Infirmary during the two years 1910 and 1911. Forty-four of these patients (42 being males and two females) suffered from perforating duodenal ulcer, and 42 (30 females and 12 males) from perforating gastric ulcer. In 26 cases the site of the perforation remained doubtful, the majority of them being described as "pyloric." There was little doubt that the great majority of the 26 doubtful cases were duodenal.

The youngest patient was sixteen years old, and the oldest seventy. Only two cases of perforation of the posterior wall occurred, one in the stomach and one in the duodenum. Gastric ulcers tend very noticeably to be limited to the region near the lesser curvature, and only one is described as being near the greater curvature. Duodenal ulcers were in the great majority of cases on the anterior surface of the first part, close to the pyloric ring.

In four cases no gross perforation was found, though general bacterial invasion of the peritoneum had taken place through the base of the ulcer. There is little evidence to be obtained from this series regarding the view recently advanced that both gastric and duodenal ulcer owe their existence to suppuration of the appendix, which may be remarkably latent. In the great majority of cases there was a definite history of previous distention or pain after food, and, in the gastric cases, of vomiting and hematemesis which had given trouble for months or years prior to the perforation. In seven of the reported cases there was no previous history of indigestion, though careful questioning in four of these showed that this

report was erroneous. Morley is inclined to agree with those who hold that an absolutely latent gastric or duodenal ulcer cannot exist, though it is beyond doubt that the symptoms may, in rare cases, be remarkably slight.

The total mortality of the series of 112 cases was 48, or 42.9 per cent.

There were 11 cases of subacute perforation, all of which were operated upon. In this condition, the perforation, as evidenced by the sudden onset of intense pain, took place with the same catastrophic abruptness as in the more usual type, and a localized subphrenic abscess resulted. Of the 11 cases five died. Of the six that recovered after drainage, one subsequently required gastroenterostomy, and one died at home five months later.

Of the 101 cases in this acute group, 43 died—a mortality of 42.6 per cent—and 58 recovered. Nine of the cases were admitted almost moribund and were not operated upon. Leaving these out of account, there was an operative mortality of 37 per cent. This refers to recovery from the actual perforation, and discharge from the hospital.

In all cases in which the patient's condition allowed, the ulcer was infolded by simple suture, with the exception of one case, in which, owing to the great friability of the edges, wide excision was necessary before suture was feasible. This case died. The peritoneum was sponged as dry as possible, drainage being employed or not, according to the apparent requirements of the case. Flushing the peritoneum was seldom adopted, and is viewed with growing disfavor, as it increases the shock of the operation and the tendency to subsequent complications, such as subphrenic abscess.

Morley considers it inadvisable, unless the stenosis is very extreme, to subject the patient to the additional risk of a gastroenterostomy. There is no doubt that, in these cases, the shorter the operation, consistent with efficient closure of the perforation and cleansing of the peritoneum, the better the prognosis; and it is safer policy to postpone gastroenterostomy until at some later date, if at all, it should clearly become indicated by signs of pyloric obstruction. In the majority of cases efficient suture of the perforation will prove, if the patient survives the danger of peritonitis, not merely to have saved his life, but to have cured him of the symptoms of chronic ulcer.

A knowledge of the cases seems to show that a long history of previous dyspepsia gives a worse prognosis, in the event of recovery from the actual perforation, than does a short history of digestive trouble.

THE DIAGNOSIS OF CEREBRAL HEMORRHAGE BY MEANS OF LUMBAR PUNCTURE.

Bigelow (*Cleveland Medical Journal*, May, 1913) noting that in many cases it is difficult to decide, from clinical signs alone, between cerebral hemorrhage and a number of other conditions which may produce more or less similar appearances, such as embolism, arteriosclerosis and lues, uremia, epilepsy, diabetes, sunstroke, poisoning, and meningitis, made a study of the value of the examination of fluid obtained by lumbar puncture in determining this question.

In order to recognize a positive or negative finding in the spinal fluid we should remember that the mixture of blood and fluid must be a homogeneous one as it flows from the needle. If we find blood unevenly mixed with the fluid, it means that there is blood in the needle derived from the tissues through which it has passed, or that a meningeal vessel has been injured by the needle; or a vessel may be entered in such a way that pure blood is obtained. In the first case the blood will be washed out in a short time, so that clear fluid may be obtained later; in the second, streaks or drops of blood will probably persist as long as the fluid is allowed to run; and in the third, pure blood will continue to flow. Another puncture is necessary in the last two cases.

The appearance of bloody spinal fluid varies greatly with the amount of blood present and with the time which has elapsed since the hemorrhage has occurred.

The fluid, if obtained soon after the hemorrhage has occurred, is slightly cloudy, with a faint copper tint, and shows little currents in it when agitated. If centrifuged or allowed to stand for a day the cells form a slight red precipitate on the bottom of the container with clear and colorless fluid above.

But a little later, at some time between thirty-six hours and five days following the hemorrhage, a marked change takes place. The fluid obtained at this time is clear and of a bright canary-yellow color, not at all suggestive of blood or hemoglobin. Microscopical examination shows the presence of a few red corpuscles (200,460 and 570 per cmm. in three cases); but the examiner, unless he has seen a similar case before, is apt to refer these cells to an accidental wounding of some vessel and still be at a loss to explain the peculiar yellow color. The yellow color may be expected to persist for about three weeks after a small hemorrhage has occurred. It is not infrequent to see a slight yellow tint in the spinal fluid from general paretics without any history of a recent "stroke" or seizure. This is probably due to small hemorrhages under or into the meninges, such as are frequently seen at autopsy.

This yellow fluid gives a marked response to all the tests for proteids, dependent, evidently, upon the serum albumen and globulin contained in the escaping blood. Cases showing a slightly larger hemorrhage than those just described make up the second class. If the fluid is obtained early there is a more marked turbidity, easily recognized as being due to blood. The color which appears after a few days is yellow, but may have a slight pinkish tinge, and turbidity persists longer than in the first class.

The color of the supernatant fluid, unlike the turbidity, seems to persist little if any longer than in the first group of cases. The next or third degree of hemorrhage results in a quite marked opacity of the mixture of blood and fluid.

In the fourth class of cases the proportion of blood in the mixture is as large or larger than that of spinal fluid. In five cases which came under this heading, only one puncture was performed in each. All the cases terminated fatally, so that there was no opportunity of following the changes which might have taken place in the fluid.

In the fifth class the writer included cases of hemiplegia, ten in number, in which the "stroke," due to hemorrhage as far as he could judge, had occurred some months or years previously; also one case in which a central hemorrhage was found at autopsy. The fluid was clear and colorless in all these cases. The cell counts averaged higher than normal, but the highest was only eight cells per cmm. The proteid content was within the normal limits in the six cases in which it was tested.

In considering the reliability of a negative finding in the spinal fluid there is about one chance in eleven that signs of hemorrhage will not make themselves evident in the fluid obtained by lumbar puncture. In regard to the reliability of a positive finding, out of nine cases diagnosed positive by lumbar puncture and which afterward came to autopsy, eight of them were verified and the remaining one was left in doubt. This last case showed blood in the spinal fluid at autopsy, but no point of hemorrhage could be found in the brain; if present, it was located in the spinal canal, which was not opened. The patient had suffered from a "stroke" in the street and never regained consciousness.

Cerebral hemorrhage can be detected by examination of the spinal fluid in perhaps 90 per cent of cases if the examination be made within three weeks after the "stroke." For the first four days or so there is a cloudiness or bloodiness of the fluid of varying degree, depending on the amount of blood which has escaped. Then a color, due to hemoglobin, varying from light canary-yellow to reddish-brown, appears and persists in some degree for about three weeks. After that time our only guide in the spinal fluid is a probable persistence for some time of a slightly elevated cell count and proteid content.

TREATMENT OF NEURALGIA AND FACIAL SPASMS BY NERVE INJECTIONS.

CAMPBELL (*Practitioner*, June, 1913) notes that an alcoholic injection of the nerve amounts to resection and possesses the advantage of leaving no scar, of being a much less serious procedure, and being capable of an indefinite number of repetitions. When we consider the fact that the Gasserian ganglion can be paralyzed by an injection made through the foramen ovale the advantage of this trivial operation over removal of the ganglion is obvious.

Neuralgia results from some disturbance in the peripheral sensory neurons, and there is a form of unilateral facial spasm which results from a lesion of the motor neurons of the facial nerve. In all such cases the offending neurons can be attacked directly by the method of injection, a substance being used which will destroy the fibers at the seat of injection. This amounts to a chemical resection, but since the separate axones are held *in situ* they are able to regenerate. The severing of the neuraxon implies an alteration of the nutrition of the entire neuron, of which it is an appendage, not only in the peripheral portion of the divided axon, but in the central portion, as well as in the cell body, the latter swelling up, the nucleus becoming eccentric and chromatolysis occurring; these changes, at least some of them, being preparatory to the process of repair. It is by virtue of this generalized effect upon the peccant neurons that injection benefits.

The major form of trigeminal neuralgia, which unlike the minor form results from extrinsic causes, such as decayed teeth and vitiated blood, is dependent for its pain and excessive irritability on the affected protoneurons. No treatment directed to the removal of peripheral irritation, nor any influence we can exert through the blood, is capable of causing more than temporary relief. By injecting the nerve the nutrition of the neurons pertaining to it is so affected that it ceases to give rise to the transmission of pain. When regeneration occurs the pain tends to recur, though generally in a less violent form. The pain recurring, the injection can always be repeated. This lengthens the period of respite. The paroxysms progressively diminish in severity. Unilateral facial spasm is incurable, save by resection, surgical or chemical. The spasm is strictly unilateral and involves all the muscles, including the stapedius and the platysma, supplied by the facial nerve. The disorder must therefore originate primarily in the motor neurons of the nerve. There is no lesion in any part of the nervous system above the facial nucleus (which contains the cell-bodies of the neurons pertaining to this nerve) which would be capable of producing spasm strictly limited to the territory of the facial nerve. Campbell believes that incident to damage of the main trunk of the facial nerve probably somewhere within its bony canal the nutrition is affected in a manner tending to augment reflex explosibility. Injection of the nerve trunk through the stylomastoid foramen induces facial paralysis, which clears up in a few months, during which time the convulsive habit has been partially or even completely broken up. If the spasm continues or recurs, a second injection may be given.

The addition of eucaine to the alcohol lessens the pain caused by the injection. The following solution may be employed:

> Eucaine, gr. ij;
> Alcohol, ʒvj;
> Aq. destill., ad ʒj.

The platinum needle is less likely to break than is a steel one. The bore of the needle should be .9 cm., and the length about 10 cm., each cm. up to 5 being marked off from the point, so that the depth of the insertion can be measured up to this amount. The needle is fitted with a stylet in order to prevent the orifice being blocked with a blood clot. The end of the stylet should be beveled so as to be flush with the beveled extremity of the needle, which is pushed on to its destination with the stylet thrust home. In regions where there is danger of wounding important

structures, some advocate the employment of a blunt-pointed stylet, which, after the skin has been pierced, is thrust beyond the point of the needle. In either case the stylet is kept in position until the nerve is reached. It is then withdrawn, and the nozzle of the syringe (containing the necessary quantity of injection fluid) fitted into the needle. The injection is then made by firm pressure upon the piston. Owing to the dense structure of the nerve tissue no small degree of pressure is needed. If the piston fails to move it may be necessary to readjust the needle cautiously.

A convenient syringe is one with a capacity of 2 Cc. From 1 to 2 Cc. should be injected. In case of a sensory nerve penetration gives rise to a burning, stinging sensation in the territory of the injected nerve. This, after a successful injection has been made, is followed by anesthesia in the same area. In case of a purely motor nerve there is no guide as to its having been reached until after the injection has been made. Rapid and complete paralysis of all the muscles supplied by the nerve would indicate that the fluid has been placed at the desired point. In the case of the sciatic nerve alcohol should not be used as it cripples the patients for months. The sheath should be injected with 100 Cc. of normal saline solution after anesthetizing the nerve by a preliminary injection of 2 Cc. of a 15-per-cent solution of B-eucaine.

The motor paralysis produced by the injection clears up within a few months; the anesthesia often long before this. The difficult foramina to reach are the foramen ovale and the foramen rotundum.

THE RELATION OF PHENOLSULPHONEPHTHALEIN EXCRETION TO THE UREA CONTENT OF THE BLOOD.

AGNEW (*Physician and Surgeon,* March, 1913) points out that the phenolsulphonephthalein test as an index of kidney efficiency has to a great extent superseded all other methods, but that the estimation in the blood of retained nitrogenous products, particularly urea, as an index of renal efficiency has within the past few years received an impetus at the hands of the French school. Since both these methods are of comparatively simple application a parallel series of determinations was made, the object being to determine whether there was a relationship between the phenolsulphonephthalein excretion and the amount of urea in the blood. As a result of this study it was found that the two methods run parallel and that with the decreased phthalein output there was an increased amount of urea in the blood. There are, however, some marked exceptions.

Agnew concludes that in general the urea content of the blood varies inversely as the excretion of phenolsulphonephthalein, but the relation is not an absolute one.

THE INDICATIONS FOR ABDONIMAL CÆSARIAN SECTION.

PETERSON (*Physician and Surgeon,* vol. xxxv, No. 3, 1913) believes that the chapter on the indications for abdominal Cæsarian section must be rewritten, on account of the great advances made in the technique. In general the indications for the operation are obstruction to labor, uterine hemorrhages, and constitutional crises.

As to concealed accidental hemorrhage, in this grave obstetrical accident the child is usually dead, and any treatment will be directed toward saving the life of the mother. Cæsarian section is indicated where the hemorrhage is severe, the mother's condition alarming and growing worse, and the cervix is so rigid as to require considerable time to secure dilatation enough to empty the uterus from below. Under such conditions probably better results will be obtained from abdominal than from vaginal Cæsarian section, unless the operator has had considerable experience with the vaginal route. As in operations for ruptured ectopic pregnancy, where the patient is in collapse and the hemorrhage progressing, the paramount necessity is to stop the bleeding quickly, and this is best accom-

plished by the abdominal route. In concealed accidental hemorrhage, fortunately rather a rare condition, the indication is to stop the bleeding and stop it quickly, if the patient's life is to be saved. But whether the abdominal or vaginal route be chosen, the uterus after being emptied should be removed. For experience has shown that in the kind of hemorrhage under discussion the uterus does not contract as it is accustomed to when emptied, but is more apt to remain in a state of atony, which means death from postpartum hemorrhage. Hysterectomy is also demanded to guard against sepsis, which is very liable to develop after severe hemorrhage from the pregnant uterus.

Abdominal section is only exceptionally indicated in placenta previa. In the majority of cases the cervix is soft enough to yield to dilatation, so that various intrauterine manipulations can be employed with a view of stopping the hemorrhage. In rare cases, as in old primiparæ, the cervix may be rigid and undilatable—that is, enough dilatation for effective intrauterine work could only be secured at the expense of time, which would increase the danger for the mother and probably prove fatal to the child. Under such conditions, if the mother has not been infected by manipulations from below, Cæsarian section is indicated. The uterus should be removed as the final step in the operation, for the reason stated when discussing the treatment of concealed hemorrhage, namely, the increased danger from sepsis in the presence of severe hemorrhage.

For those who do not believe in the immediate emptying of the uterus as soon as the patient has been seized with eclamptic convulsions, neither abdominal nor vaginal Cæsarian section is ever indicated. However, the majority of obstetricians believe that in the presence of eclampsia the uterus should be emptied quickly with the least possible trauma. If the cervix is easily dilatable, neither vaginal nor abdominal Cæsarian section will be indicated. In the presence of a rigid cervix, however, either one or the other route is indicated, rather than the wasting of valuable time over slow cervical dilatation. In the majority of instances vaginal Cæsarian section is the preferable operation, since it is performed from below without entering the peritoneal cavity. Where the pelvis is contracted abdominal Cæsarian section is indicated, provided the patient has not been infected from below by repeated examinations or unsuccessful attempts at delivery. Under such conditions craniotomy on the living or dead child is the preferable operation.

The writer is at the present time engaged in tabulating the results of 425 cases of eclampsia treated by abdominal Cæsarian section, and some very interesting facts are being brought out. Not only has the literature been carefully searched and all recorded cases been collected, but many operators all over the world have been kind enough to furnish him with unpublished cases. Thus the statistics represent not the work of a few, but over two hundred operators.

The total maternal mortality, counting patients operated upon before the aseptic era, was thirty-six and nine-tenths per cent, while this was reduced to thirty-one and and eight-tenths per cent if only the 317 patients operated upon since 1900 are counted. The fifty per cent mortality ascribed to abdominal Cæsarian section in the treatment of eclampsia can be explained by errors in the selection of cases, for many eclamptics were subjected to the operation who were hopelessly septic. These patients did not die from the eclampsia or the operation itself. Many of them perished because of the poor judgment on the part of the operators. They would have died even if the operations had not been performed for eclampsia.

In 245 cases of eclampsia in which there was no sepsis or very little chance of sepsis prior to the abdominal Cæsarian section, the maternal mortality was only twenty-four per cent. It is significant that in fifty cases in which operative procedure preceded the Cæsarian sections the maternal mortality was forty-eight per cent, the difference in mortality being due, not to eclampsia, but

to the sepsis accompanying the eclampsia, a condition which can be avoided once this relation of sepsis to Cæsarian section is fully realized by the profession.

The results of abdominal Cæsarian section for eclampsia so far as the fetus is concerned should be, and as a matter of fact are, gratifying in the four hundred and twenty-five cases. In 317 cases since 1900, in which the fetal statistics could be studied, the fetal mortality was only five and five-tenths per cent. Even this mortality is reduced to three and seven-tenths per cent in one hundred and thirty-two cases in which the sections were performed after from one to five eclamptic convulsions.

These statistics are quoted to show that the last word has not been said regarding the place of abdominal Cæsarian section in eclampsia. At least, the statistics in over four hundred cases have shown beyond a doubt that no one is justified in dismissing the treatment of eclampsia by abdominal Cæsarian section with a short statement that the mortality is so high as to make it an unjustifiable operation.

LYMPHANGIOPLASTY.

Syms (*Annals of Surgery*, June, 1913) finds that Handley's operation has been employed for the following conditions: Brawny arm the result of breast cancer, elephantiasis, chronic edema of the leg; chronic or hard edema of the face and eyelids following erysipelas; and ascites due to cirrhosis of the liver. Madden, Ibrahim and Ferguson show experimentally that artificial lymph channels will not persist for any length of time. Their conclusions, drawn from their clinical observations and their experimental observations, are as follows:

Clinically, it is abundantly evident that lymphangioplasty fails to effect anything but a very temporary improvement in elephantiasis of the legs. The swelling is markedly reduced within forty-eight hours after the operation; but the improvement persists only so long as the recumbent position is maintained. Within at most twenty-one days after the operation, or as soon as the patient begins to walk, the swelling invariably returns and no permanent improvement results.

The examination of the tissues surrounding the threads introduced during the operation of lymphangioplasty in cases of elephantiasis, and also around threads introduced into healthy tissues of man and of guinea-pigs, supplies very adequate reasons for the failure of the operation.

Important as the action of gravity may be in contributing to the failure to maintain a new and artificially produced lymphatic circulation, it appears that this want of success is due in far greater degree to definite reactive changes in the tissues immediately around the thread, which soon isolate the new lymph tube from the surrounding lymphatic areas and eventually completely obliterate it.

Briefly the series of changes in the tissues around the buried longitudinal threads in the subcutaneous tissues are as follows:

For a short time the threads, by virtue of their capillary action, drain the surrounding tissues of the lymph contained in them.

The threads in the tissues soon excite a definite cellular reaction, which leads comparatively soon—from fourteen to twenty-one days—to the formation of a dense and progressively contracting fibrous tissue. This walls off the thread and crushes the adjacent lymphatics out of existence, and thus effectually prevents any absorption of fluid into the space immediately around the thread itself. These fibrous changes, occurring around the ends of the thread, as well as along its whole length, eventually completely isolate it, and it may then perhaps be compared to a long worm lying within an impermeable sheath.

The thread is later penetrated by rows of cells, running in along its fibrils, which must eventually lead to its complete disintegration, and the formation of a solid column of dense fibrous tissue along which no absorption of fluid of any kind can possibly occur.

In summing up their findings of reported cases of the application of lymphangioplasty in various conditions, we see that the results have been as follows:

Brawny arm, 20 cases, with 9 successes and 9 failures, and 2 cases with no report as to swelling.

Elephantiasis, 17 cases, with practically 17 failures.

Chronic edema of the leg (not elephantiasis), 3 cases, with 3 successes.

Chronic edema of the face and eyelids, 3 cases, with 3 successes.

Ascites, 10 cases, with success in 5 and with partial success or failure in 5.

In considering the results in brawny arm and in studying the reports of cases, we must give due consideration to the more or less indefiniteness of the condition. The author has classed as successes those cases in which there was marked diminution in the swelling and in which there was satisfactory relief of pain and disability. The author does not believe that the operation has been a complete success in any of the cases thus far reported, nor does he believe, as it has been claimed, that the operation produces a restoration amounting to the normal condition. However, he thinks it is fair to concede that the operation has been a success in any case in which it has produced a marked reduction of the swelling with a consequent improvement in the subjective symptoms.

In a limited number of cases it has met with success in the treatment of chronic edema of the face and of the leg (not due to elephantiasis). We may find its greatest usefulness in cases of ascites due to cirrhosis of the liver.

IDIOPATHIC DILATATION OF THE ESOPHAGUS.

Heyrovsky (*Archiv f. klin. Chir.*, 1913, Bd. c, S. 702), in a valuable contribution to the literature on this subject, notes the fact that in the past two years ten cases have come up for treatment in one surgical clinic in Vienna (Hochenegg).

The dilatation usually begins and is most marked in the mid-thoracic portion of the esophagus, the channel assuming a spindle-shaped form. From increase in the length there is often a looping above the diaphragm. There is muscular hypertrophy; in some cases, however, in which the dilatation is extreme, there is atrophy.

The leading symptoms of this condition are dysphagia, regurgitation of the food and saliva, and a feeling of pressure in the chest after meals In early or slight cases the patient often succeeds in forcing the food into the stomach by such maneuvers as drinking water, swallowing air, and then pressing with the glottis closed. In this way sufficient nourishment may be obtained to permit of the patient remaining for a long time in a good state of nutrition. In severe cases, however, death may occur from inanition.

An exact diagnosis of the condition can only be arrived at by esophagoscopy or by *x*-ray examination after a bismuth meal. The primary cause of the dilatation is not fully understood. Whilst cardiospasm is undoubtedly present in a large proportion of cases, in a certain number no spasm of the cardia is found. To account for the latter, such causes as primary atony of the musculature and congenital dilatation of the esophagus have been invoked. The condition of cardiospasm and the extreme dilatation of the esophagus which accompanies it, a dilatation much more pronounced than is ever met with above a simple stenosis of the esophagus, are best accounted for by some disturbance in the innervation of the parts involved. Experimental observations have shown that the vagus nerve not only supplies the musculature of the esophagus, but controls the tonus of the cardia. In certain derangements of the vagus it is possible to have, along with an atony of the musculature of the esophagus, a hypertonicity of the cardiac sphincter. Moreover, in not a few cases of cardiospasm met with clinically, an increased vagus tone has been shown to exist, and in some of these a definite organic cause for the reflex vagus irritation, such as ulceration in the esophagus or stomach, small diverticula of the

esophagus, or even diseases of more distant organs, has been found. In only two instances as yet have definite pathological changes in the vagus nerves been demonstrated.

The treatment of the condition must vary according to the severity of the case. In slight cases of cardiospasm such measures as suitable diet, regular esophageal lavage, the administration of atropine, and possibly feeding by the stomach-tube will often cure the condition. In more advanced cases dilatation of the cardiac orifice by means of an inflatable bougie passed downward from the mouth is undoubtedly the best form of treatment, and if skilfully carried out will give relief in the majority of cases. In a certain number, however, and particularly in those in which the esophagus has become lengthened and has formed a loop above the diaphragm, a bougie passed from the mouth cannot be made to enter the cardiac orifice. For such cases some operative measure is indicated.

Whatever be the operative method adopted, a preliminary gastrostomy should be performed, and time allowed for the patient to pick up strength before the more serious part of the operation is undertaken.

Of the operative measures, the favorite one has been opening the stomach and dilating the cardiac orifice from below by means of the fingers or some metal dilator. Extra-mucous cardioplasty, on the same plan as the corresponding operation at the pylorus, has also been carried out with moderate success.

Taking advantage of the fact that the esophagus is often definitely lengthened, Heyrovsky has carried out successfully in two cases a subdiaphragmatic esophagogastrostomy. This operation consists in freeing the lower end of the esophagus from its attachments to the diaphragm, pulling down the slack through the esophageal opening—in both of Heyrovsky's cases about 6 cm. of esophagus came down readily—and then performing a lateral anastomosis between the dilated lower end of the esophagus and the fundus of the stomach. The left vagus nerve may be in the way, but can be divided without harm ensuing. The great advantage of this operation over all other plastic and anastomotic operations on the esophagus is that the left pleural cavity is not opened, and the chief danger of such operations, namely empyema, is avoided.—*Edinburgh Medical Journal,* July, 1913.

THE DIFFERENT APPROACHES TO THE HIP-JOINT.

BRACKETT (*Publication of the Massachusetts General Hospital,* vol. iv, No. 1) after calling attention to the difficulties connected with approach to the hip-joint, notes that this should be effected as completely as possible and with least trauma to surrounding soft parts, which involves muscle splitting when possible and a minor degree of retraction in order to avoid injury to the smaller nerve branches which supply these muscles at points of entrance. Among the most practical routes are the following:

The incision, made from one inch to the inside of the anterior superior spine directly downward six inches, discloses the inner border of the sartorius muscle attached to the fascia covering the vessels. The external cutaneous nerve lies near to the outer edge of the fascia; the external saphenous vein lies under the superior layer and internal to the anterior crural nerve. Dissection downward along the dividing edge of the sartorius and the fascia, and retraction of the sartorius to the outside, opens to the inner side of the upper portion of the rectus, covered by a fold of the same fascia. Incision through this opens to the line dividing the inner edge of the rectus and the outer edge of the iliacus; the vessels and anterior crural nerve are near, but to the inner side, the nerve lying in this fascia a little to the inside and below the external cutaneous nerve, and with the large vessels immediately in the inside. In the lower region of the wound, between the rectus and iliacus, are the small but im-

portant circumflex vessels. The floor of the field is made by the iliacus muscle, which lies directly on the capsule of the inner portion of the neck.

From this point the way may diverge and two choices are open:

The outer—between the iliacus and rectus; the separation of these two opens immediately to the capsule, just at the inner side of the neck at the point of its junction with the head. A portion of the Y ligament of the capsule is in the bottom of the field. To reach the upper anterior edge of the acetabulum, the dissection must be carried high, nearly to the level of Poupart's ligaments.

The inner—retracting the fascia still further to the inside, along the surface of the iliacus, the dividing line of the iliacus and of the psoas tendon is reached. These are easily separated, and between them lies the anterior edge of the head and the anterior rim of the acetabulum.

The first opens up the anterior capsular cavity. The second is too near the capsular attachment, and above the acetabulum rim, to be of much use in the exploration of its cavity. The field is so restricted in both that their use is mainly in an attempt to inspect the anterior portion of the articular head, or of the neck at its junction with the head, which can be done by rotation of the leg, with the capsule relaxed by flexion of the thigh.

In a conservative operation, the capsule may be opened and the anterior part of the neck, the edge of the head, and the rim of the acetabulum examined, but the restricted field prevents any extended exploration.

The incision, made from just below the anterior superior spine directly downward, five or six inches, exposes the line of division between the sartorius and tensor fascia femoris. At the upper portion the fibers of the sartorius are nearly vertical, and parallel to the fibers of the tensor fascia femoris, but about three inches below its origin the outer edge of the muscle takes a rather sharp bend inward. The two muscles are easily separated, and this separation must be carried high, nearly to the point of their origin, where the two muscles are closely blended, having their origins much in common. Retracting the sartorius to the inside, the upper portion of the rectus is seen lying in the interval between the two. Retracting the sartorius and rectus to the inside, and lifting at the same time the outer edge of the iliacus, exposes the outer portion of the capsular cavity. Through this opening the anterior surface of the neck and the edge of the head may be brought into view, particularly when the thigh is flexed. Retracting the sartorius and rectus to the inside, and the tensor fascia femoris to the outside, exposes the anterior surface of the trochanter and outer portion of the neck. In the lower portion of this area are found the smaller circumflex vessels embedded in the intermuscular fat. On the inner side, lying on the neck, is the outer edge of the iliacus, passing to the lesser trochanter; in the lower and outer portion of this area are the upper fibers of the vastus externus, extending to the middle of the trochanter in their attachment to the femur. The muscles on the outer side are easily retracted so as to expose the outer edge of the trochanter; and on the inner side the edge of the iliacus is lifted and retracted so as to bring into view the lesser trochanter. This field, when retraction is made to the outside, gives free access to the anterior surface of the femur, from the outer border of the middle of the trochanter to the junction of the neck and shaft, just above the lesser trochanter.

Lateral route: The lateral incision is made from the anterior superior spine, obliquely downward and outward to the middle of the outer side of the trochanter, and is then turned downward two inches, in the line of the femur. In the center of the field is the dividing line between the tensor fascia femoris and gluteus medius covered by the upper portion of the fascia lata, which at this point is so dense that the line of muscle division cannot be seen through the fascia, and is often not easy to find even after opening the fascia. Two

anatomical facts are here of aid: (1) The upper portion of the tensor fascia femoris is entirely free from the fascia, while the fibers of the gluteus medius are attached to the under surface of the fascia. (2) The gluteus medius is a coarser muscle than the tensor fascia femoris, and, therefore, the difference in grain is a distinguishing mark. The upper portion of the tensor fascia femoris is clearly defined and band-like; the lower part is ill defined and begins to be attached to and merged into the fascia lata; its lower edge overlaps the anterior edge of the gluteus medius, the fibers of which run in a more oblique direction downward. The lower portion of the gluteus medius begins to get fascial, merging into the fascia of its attachment to the trochanter; therefore, the easiest place to find the dividing line is midway between the anterior superior spine and the trochanter.

Underlying the tensor fascia femoris, seen when looking toward the joint from the lateral aspect, is the upper part of the rectus, which lies between the inner edge of the tensor fascia femoris above and the neck of the femur below. Carrying the separation of these muscles high, the fibers of the horizontal extension of the tendon of the rectus are seen, just above the upper and anterior edge of the acetabulum, and are a guide to the joint. Elevation of the upper portion of the rectus, with the tensor fascia femoris, discloses the outer edge of the iliacus, in its passage over the neck to the lesser trochanter.

The area exposed is the upper part of the trochanter and the neck; inward to the rim of the anterior and upper edge of the acetabulum; downward to the lesser trochanter; and upward to the level of the tip of the greater trochanter. The portion of the capsule, and the upper side of the neck, and the portion of the acetabular rim corresponding to it, cannot be reached by this route with sufficient freedom for any extensive surgical procedure. The capsule in the exposed region is in view, and by the flexion of the thigh is relaxed and the cavity opened with ease. The head of the femur can be rotated so as to expose a portion of the cartilaginous surface, enough to determine its character, but the field of operative procedure is limited to this smaller area, except by extensive myotomy.

Lateroposterior route: The first part of the incision and dissection is identical with the lateral incision. Especial care must be taken to end the vertical portion well up on the outside of the trochanter (1½ inches from the tip) and well down toward its posterior border. At the point where the oblique portion joins the vertical, just over the trochanter, an angle incision is made directly backward, two to three inches, down to the fascial portion of the gluteus maximus. After separating the tensor fascia femoris and the gluteus medius, the line of separation is extended downward along the line of the original incision, through the fascia lata, to the femur, freeing the attachments of the muscles (vastus externus) from the outer and upper surfaces of the femur.

The fascial expansion of the gluteus maximus is then cut through, along the line of the posterior part of the original incision, and the outer part of the trochanter exposed. This gluteal flap is turned backward, and the outer and upper surfaces of the trochanter fully exposed, this being necessary for the later wiring. The outer and upper surface of the trochanter is then chiseled off by cutting directly backward with a narrow osteotome, on a curved line beginning on the outer surface of the trochanter, 1½ inches below the tip, and cutting inward for one-quarter of an inch, then curving upward to the fossa at the junction of the upper part of the neck and the trochanter. This removes the outer portion and tip of the trochanter, with the attachments of the gluteus medius, gluteus minimus, and pyriformis. Care should be taken in the removal of this piece not to encroach on the neck, or the bone will be weakened at this angle. The portion of the bone removed with the muscles attached is deflected backward and upward enough to

uncover the upper part of the femoral neck, and the muscular covering and the anterior fibers of the gluteus medius and minimus are easily separated from the region above the acetabular rim. The incision through the trochanter just borders on or opens the outer edge of the capsule on the upper surface of the neck, and incision of this opens directly into the cavity of the joint. The capsule may be split along its upper surface, parallel to the neck, and near to its acetabular insertion cut transversely on each side, which opens the view of the edge of the head and the rim of the upper half of the acetabulum. This route gives the most extensive view of the hip and its surrounding structures, and brings within view, within the capsular cavity, the upper part of the neck, the portion of the head outside the acetabular cavity, and the upper half of the rim of the acetabulum and cotyloid ligament. It is the best approach for any of the more extensive explorations and operations on the joint, particularly for the arthrodeses. By rotation of the femur, the extensive opening allows the largest amount of the articular surface of the head to be brought into view, and thus in operation on the articular structures the opening gives a freer access than any of the other avenues of approach.

Posterior route: The incision is made over the upper part of the buttock, in a line extending from the junction of the middle and posterior third of the ilium to the middle of the trochanter. The subcutaneous fat must be well separated from the underlying fascia, and the field then brings into view the anterior edge of the gluteus maximus, blending into the fascia lata, and so closely adherent to it that a sharp line of demarcation cannot be found. The gluteus medius lies beneath that anterior portion of the fascia which is exposed, but its posterior edge underlies the gluteus maximus. To reach this border, the gluteus maximus must be strongly retracted backward, or a few of the anterior fascial fibers of attachment cut and deflected backward. The posterior edges of the gluteus medius and minimus practically overlie each other; the tendon of the pyriformis lies in contact with the posterior edge of the minimus, closely adherent to it. It is not necessary to disturb their relation to each other. Retraction forward of the posterior edge of the minimus discloses the capsule of the joint, which may be opened along the edge of the pyriformis tendon. This divides the capsule slightly more horizontally than the direction of its fibers, and opens the capsular cavity along the posterior and upper part of the neck and head. This route should seldom be taken for any procedure, excepting incision of the joint proper, or exploration of the posterior capsular cavity. It is the natural avenue for reaching the gluteal bursa of this region, which it is often necessary to reach in conditions of its primary involvement, which conditions closely resemble the early stages of hip disease.

STRANGULATED INGUINAL HERNIA IN EARLY INFANCY.

COLLINS (*Journal-Lancet*, April 15, 1913) summarizes an excellent article on this subject as follows:

In proportion to the large number of herniæ existing in infants and children, the strangulated cases are comparatively rare, though case reports are becoming more numerous. It would seem that the older the infant, the fewer cases of strangulation we find. In other words, hernia strangulation under one year is more common than later. Statistics show the greatest frequency in the first three months of life. The relative frequency of strangulation in children to that in adults is variously estimated as 1 to 62 in one instance; 1 to 107 in another; and 1 to 108 in a third.

There seems to be a tendency to underestimate rather than to overestimate the number of cases calling for operation.

Writers are not agreed as to the specific cause of strangulation. Few cases are reported wherein is demonstrated incarcera-

tion. The relatively short duration of strangulation probably accounts for this.

The cardinal symptoms peculiar to infants are violent and uncontrollable screaming, recurrent vomiting (often fecal), retention of the urine, drawn facies, constipation, and tendency to rapid collapse. The small intestine is most frequently found in the hernial sac; the cecum and appendix have been found in from 7 to 20 per cent; the omentum is rarely found.

In the diagnosis one must be on the lookout for the possibility of acute hydrocele; also acute inflamed ectopic testicle.

Authorities are agreed that the prognosis in these cases is good in proportion as the diagnosis is established early and the case operated on promptly. Some writers believe a bad prognosis should never be given, unless the child is discovered to be in a very serious condition when first seen. Some of the worst cases of gangrene and perforation have recovered under proper surgical treatment. Fear of infection should not be considered a serious objection to operating when done under proper conditions.

While infants show a tendency toward collapse where the hernia is in a state of strangulation, this resolves itself when the strangulation is relieved, and they recover very rapidly and quite satisfactorily.

The consensus of opinion is that the mortality should be much less than in similar cases with adults. Most of the fatalities are due to waiting. Dowd believes the mortality should be ten per cent or less when the operation occurs promptly. Other writers would cut this down to three per cent or even less than one per cent.

Too vigorous or prolonged efforts at taxis are dangerous, and rough handling courts disaster. Taxis is seldom rewarded by reduction of the hernial tumor; and it is almost axiomatic that with the failure of reduction by taxis operation is imperative, or the child will most assuredly die. Gangrene is the ultimate result of unrelieved strangulation.

The anesthetic used in most cases has been chloroform. Ether will be found preferable by those who are most accustomed to its use.

The Bassini operation is favored by Cumston and others. The simplest operation is the best, bearing in mind that the operation is done primarily to save life, and not primarily to effect a radical cure. From the number of successful cases reported, the tender age of the patient does not forbid the procedure. On the other hand, procrastination and too much insult by taxis is unjustifiable and increases mortality.

The urgency of treatment is greater in infants than in like cases occurring in adults, owing to the rapidity of necrotic changes following embarrassed circulation; also greater owing to the early appearance of shock.

Care should be rigorously exercised lest in treatment of the sac the delicate vas be injured by manipulation. The risk of removing the sac is therefore emphasized.

The manner of suture, closure, dressings, and other after-care will depend upon the operator and his preferences. The experience of the past has given no didactic rule.

THE RESULT OF FILIGREE IMPLANTATION.

McGAVIN (*International Abstract of Surgery*, May, 1913; quoted from the Proceedings of the Royal Society of Medicine, 1912, vi, 103) makes the following assumptions:

(1) That Bassini's operation for inguinal hernia is an excellent method and can be applied successfully to most cases in young adults. (2) That in the event of failure, further attempt, by increasing the amount of stretched cicatrix, distinctly increases the prospect of recurrence. (4) That the application of a truss is a confession of failure, a disappointment to the patient, and very often the cause of the enlargement of the hernial ring. (5) That ventral hernias in the stout and elderly are uncontrollable by any form of retention apparatus, because the apparatus cannot pre-

vent the spread of the hernia laterally in the deeper planes of the abdominal wall.

Since the introduction of filigree transplantation, 314 hernias of all kinds, excepting femoral hernia, have been operated upon by the author. Of these 263 were inguinal and 51 were umbilical or ventral. Of the inguinal cases 106 were treated by filigree implantation, and of the umbilicoventral 40; adding to these 20 cases of inguinal implantation done on both sides, the total number of implantations of all varieties is 166.

Of the inguinal hernias, all but six were in men, many of whom were engaged in the hardest manual labor, viz., stoking. Of the 51 umbilical and ventral hernias, only 15 were in men and 36 in women, many of the latter being enormously stout. Many of the patients had repeatedly been operated upon ineffectually. Since advanced age is considered as compromising a successful result, it is interesting to note the ages of the patients. Of the 146 cases of implantation, 11 were over 60 years of age, 27 were between 50 and 60, 48 were between 40 and 50, the remainder being under the age of 40.

The cases were dealt with by implantation for one or more of the following reasons: either they were of large size, of long standing, in elderly subjects, were affected by the atrophy of truss pressure, exhibited a wide hernial gap, or they occurred in men whose work was unusually heavy.

Of all these cases only two suffered a recurrence. Both were of the inguinal variety. The first was one of the early cases, which suppurated, and the iliac section shifted its position. A succeeding operation proved successful. The second case was due to the placing of the pubic section of the filigree upon extraperitoneal tissue, which proved too loose and lax to hold it in position. It shifted and the hernia recurred, after one year, between the filigree and the pubic spine. The operation was repeated, but it has only recently been performed. These are the only cases of recurrence, and many of the operations were done more than six years ago.

The presence of the filigree has given rise to no untoward symptoms: there has been no pain, discomfort, swelling, nor atrophy of the testis, nor has there been any evidence of the excessive formation of adhesions, even below the level of the semilunar fold of Douglas, where the filigree has rested actually upon the peritoneum.

The following conclusions are reached by the author:

There are few, if any, h rnias, whether inguinal or ventral, which can now be considered incurable.

In filigree implantation is to be found the only true radical cure that we know of at present.

The use of filigree is attended by a slight increase in the danger of sepsis.

Suppuration is not an indication for the removal of a filigree.

Wires displaced into sinuses should be removed without disturbing the filigree.

No belt or truss should ever be applied on the top of an implanted filigree.

For the reduction of very large inguinal hernias and the avoidance of paralytic ilius the Trendelenburg position should be used, the abdomen opened, and the bowel withdrawn from within, aided by pressure from without.

In ventral hernias following appendicular abscess it is absolutely essential that the appendix be removed before implantation if this has not already been carried out.

Although in ordinary cases the lines elsewhere laid down with regard to the size, shape, and position of the filigree should be adhered to as closely as possible, it must be remembered that cases will arise which will tax to the utmost the ingenuity of the surgeon. In such cases hidebound rules are worse than useless.

It is important in dealing with gigantic hernias that every precaution should be taken for the comfort and safety of the patient. There must be skilled assistance, full facilities for asepsis, a good light and plenty of it, and, as a matter of choice, spinal analgesia should replace general anesthesia.

REVIEWS.

A Clinical Manual of Mental Diseases. By F. X. Dercum, M.D., Ph.D. The W. B. Saunders Co., Philadelphia, 1913.

Dr. Dercum has prepared a useful clinical manual which is based upon his annual course of lectures upon nervous and mental diseases delivered at the Jefferson Medical College. He has endeavored to present his subject in a simple and thorough manner and to keep the volume within the limits of a convenient space, with special emphasis upon the clinical pictures which he presents and upon prognosis and treatment. His main object has been to prepare a book which would enable the general practitioner or family physician, who nearly always sees the patient first, to recognize mental diseases in their early stages, to know what to do, when to commit and when not to commit a patient to an asylum, and finally he tells how the patient should be treated in his own home, if institutional care is not desirable. He also emphasizes the point so long ignored that an insane man is a sick man and requires a sick man's care.

After a chapter dealing with the classification of mental disturbances Dr. Dercum considers the various forms of delirium, confusion, and stupor, then melancholia, mania, circular insanity, and manicdepressive insanity. Chapter V deals with the heboid paranoid group, Chapter VI with the neurasthenic neuropathic insanities, and Chapter VII with the dementias. The second part of the book considers the different forms of mental diseases related to somatic affections. This is perhaps the most important part of the volume. There are four chapters in it, covering about 150 pages, including the mental diseases relating to age and the mental disorders not ordinarily included under insanity. In Part III there is a chapter upon the psychological interpreting of the symptoms, and Part IV deals with treatment as to prevention, and the care of the insane in and out of institutions. Dr. Dercum has given us a volume which does not profess to be an exhaustive discussion of a very involved subject. On the contrary, it sets forth the results of the author's own clinical experience combined with the information which he has gained by wide reading and long experience as an active practitioner, didactic lecturer, and clinical teacher. These factors have so trained his mind that he is able to present a difficult subject to the general practitioner in a way which is interesting and easily understood.

Studies Concerning Glycosuria and Diabetes. By Edward M. Allen, A.B., M.D. W. M. Leonard, Publisher, Boston, 1913.

When a reviewer has presented to him a volume which covers nearly 1200 pages and deals with only one disorder of nutrition or disease, he is naturally somewhat startled. The author tells us that the present work represents three years of research in the laboratory of Preventive Medicine and Hygiene in the Harvard Medical School, and that various grants have been made to him for the prosecution of his studies. Much of the pathological material has been worked up by no less a pathologist than Mallory, and Joslin, Pratt, and Cushing have all materially aided him. Particular pains are taken to deal distinctively with glycosuria as compared to diabetes.

The scope of the present monograph is quite different from other standard books upon diabetes in that it aims primarily to present the results of research and experimental investigation, and, as the author says, "is more like a long journal article." This it certainly is with a vengeance. An endeavor has been made to bring up the consideration of the literature to November 1, 1912, although no effort at a complete bibliography has been attempted. The author states that the subject of diabetes heretofore might have been called "a big blooming, buzzing confusion," and he hopes that the present investigation may tend to simplify this confusion. This is certainly an excellent ambi-

tion, and the author has undoubtedly strenuously striven to carry out his ideals. Finally, his purpose has been from the outset to present an improved therapy of diabetes, and he goes so far as to believe that a curative method of treating diabetes is at hand. It is evident, therefore, that the author is possessed of an optimism which we fear many members of the profession lack. The book will probably be purchased by doctors who are diabetics and by glycosurics. It will undoubtedly find its place in medical libraries, and in its pages much valuable information is to be obtained; but that it will prove to be a popular reference book or manual with the general practitioner seems impossible.

ANATOMY, DESCRIPTIVE AND APPLIED. By Henry Gray, F.R.S. New American Edition. Thoroughly Revised and Reëdited by Edward Anthony Spitzka, M.D. Illustrated with 1225 engravings, some of them in colors. Lea & Febiger, Philadelphia, 1913. Price $6.00.

When we recall the fact that Henry Gray died at so early an age that he had scarcely reached the period of full development, and when we also recall that in all the years which have passed since his death Gray's Anatomy has been the standard text-book of the English-speaking world, we realize that we have before us one of the marvels of medical literature. Able editors in this country and England have constantly kept the text up to the advances of modern anatomical knowledge. This edition of Gray is the second one prepared by Dr. Spitzka, than whom no one is better qualified. The present volume contains the ordinary terms with which most practitioners are familiar, followed by those of the Basle Anatomical Nomenclature. This is important because it is generally recognized that undoubtedly anatomy will be everywhere taught according to the Basle method, but in a transition period like the present both sets of terms are necessarily employed. Not only is the text as clear and accurate as it has always been, but the old custom of engraving the names of the parts directly under the illustrations is also adhered to.

Doubtless Henry Gray would not recognize his own Anatomy were he to see this modern volume, but the foundation which he laid seems to be imperishable, and the superstructure which has been so often remodeled and rebuilt by others has been so skilfully designed that a homogeneous and complete work is at the hand of every medical man. So far as we know there is no other book in the history of medicine which has maintained its usefulness for half a century and which promises to become more and more popular as the years go by and new editions appear.

A REFERENCE HANDBOOK OF THE MEDICAL SCIENCES. Third Edition, Completely Revised and Rewritten. Edited by Thomas Lathrop Stedman, A.M., M.D. Volume II. William Wood & Co., New York, 1913.

Some months ago we called attention to the fact that the third edition of this standard work was appearing under the able editorship of Dr. Stedman. It will be remembered that the first and second editions were edited by Dr. Albert H. Buck. We doubt not that many practitioners during the last twenty years have culled from the preceding editions, when they have been fortunate enough to possess them, a vast amount of useful information.

For the benefit of those who are unfamiliar with these volumes it may be pointed out that they are of the nature of a medical encyclopedia. Every department of medical science is included, as well as medical biography. As an illustration of how well up to date the text is we may mention the fact that there is a biography of Dr. John Shaw Billings, who died March 11, 1913. The present edition is to consist of eight volumes, all of which are more or less copiously illustrated in black and white and with colored plates.

He who possesses this medical encyclopedia may rest assured that he has the latest information in regard to all departments of medical learning. The publication is at once creditable to the publishers and to the medical profession as well, in that it shows that even so large and expensive a work is fully appreciated and generously purchased.

DIET IN HEALTH AND DISEASE. By Julius Friedenwald, M.D., and John Ruhräh, M.D. Fourth Edition. Thoroughly Revised and Enlarged. The W. B. Saunders Co., Philadelphia, 1913. Price $4.00.

In nine years four editions of this book have been called for, which indicates, first, that the authors have presented their subject in a satisfactory way to the practitioner, and secondly, that the profession is more and more interested in the important subject of the use of foods in the treatment of disease and in the maintenance of health in those who are considered to be well. Not only are various foods considered, but there is also a chapter dealing with the mineral waters which are commonly employed in the cure of disease. In the article on "Coffee" the authors dodge the interesting question as to whether it is deleterious or useful, although the general trend of their remarks seems to indicate that they believe in the latter view. The book deals first of course with the general subject of dietetics and nutrition, later with the use of foods in the treatment of disease, then with the various rations that are used in the Army and Navy, in hospitals and public institutions, and lastly gives directions for preparation of meats, soups, and beverages, with a brief description of the care and preparation of milk and other foods for infants.

OBSTETRICS FOR NURSES. By Joseph B. De Lee, M.D. New Fourth Edition. The W. B. Saunders Co., Philadelphia, 1913. Price $2.50.

The fact that since the last edition of this book was published De Lee has placed before the medical profession a most excellent work on Obstetrics, indicates that he is more than well qualified to gather together in useful form the facts which a nurse ought to know. We confess that we see little use in the antique figure which opens the volume or in the picture of a case of labor in Holland in the seventeenth century, although it is interesting to note in this latter picture that the patient is very much more covered than she commonly is in these modern days. The illustrations as a rule are very good indeed; in most instances even without reading the text the nurse after carefully studying them would be of material aid to the physician. For these reasons it is not surprising that four editions have appeared in the last nine years. The present edition has not only been revised but entirely reset, reprinted, and recopyrighted. Physicians will do well to have this book in their libraries, not only that it may be handed to nurses who are caring for cases under their charge, but also because they will from time to time find much useful information in it as to their own methods of procedure.

HEART DISEASE, BLOOD-PRESSURE, AND THE NAUHEIM TREATMENT. By Lewis Faugeres Bishop, A.M., M.D. Fourth Edition. The Funk & Wagnalls Co., New York, 1913. Price $3.00.

Dr. Bishop's little volume, which covers less than 300 pages, is, we are told, not intended for the heart specialist, but has been written for the general practitioner. It endeavors to supply the information required in the management of heart diseases and their accompanying arteriosclerotic changes, and also deals with the Nauheim method, which is so largely resorted to abroad, and to a less extent by means of artificial baths in this country.

The fourth edition differs from its predecessors in that a chapter has been added upon the construction and use of blood-pressure instruments. The book is based largely upon personal experience and does not deal to any great extent with the literature of the subject, although at intervals rather copious quotations from other writers are indulged in. Unfortunately, the price which is charged for this small volume is so high that we fear that it will materially interfere with its popularity.

GOUT: ITS ETIOLOGY, PATHOLOGY AND TREATMENT. By James Lindsay, M.B., M.R.C.P. The Oxford University Press, New York, 1913. Price $1.50.

Dr. Lindsay tells us that the object of his little book is to present to the profession the results of his observations in the study of 600 cases of gout. As this is a subject which is becoming increasingly interesting to medical men in the United States, the book has a field which some years ago

would not have existed. He divides his text into six sections, the first dealing with the etiology of gout, the second with its morbid anatomy and pathology, the third with the symptoms and forms of gout, the fourth with the *x*-ray treatment and diagnosis, the fifth with the differential diagnosis of gout, and the sixth with its treatment, general and local, by drugs, by diet, by mineral waters taken at home, and by their use at various spas.

HEADACHE: ITS VARIETIES AND TREATMENT. By Dr. Siegmund Auerbach. Translated by Ernest Playfair, M.B., M.R.C.P. The Oxford University Press, New York, 1913.

Dr. Auerbach, in the preparation of this small book of 200 pages, is convinced that although many books, encyclopedic and otherwise, deal with headache, very few of them discuss the matter sufficiently clearly and satisfactorily to be of advantage to the physician who is called upon to treat this troublesome manifestation of functional or organic disturbance, particularly in reference to chronic headache. It deals with the classification of different forms of headache, taking up migraine, neurasthenic and rheumatic headaches, and headaches associated with individual diseases of the organs, the headaches associated with general diseases, and headaches associated with frontal sinus infection and supraorbital neuralgia. He cites a considerable number of cases to illustrate his views. It does not seem to us that he has enough to say about the treatment which should be instituted. He deals more largely with the etiology and pathology of this common and annoying malady.

SKIN DISEASES IN GENERAL PRACTICE. Their Recognition and Treatment. By Haldin Davis, M.B., B.A., F.R.C.S., M.R.C.P. The Oxford University Press, New York and London, 1913. Price $3.75.

The object of this book, as is indicated in its title, is to be thoroughly practical. The author devised its plan because his experience led him to believe that not infrequently the general practitioner had come before him cases of skin lesions which he found it difficult to diagnose and equally difficult to treat. The author found when he consulted many excellent text-books on dermatology that the classification was founded upon etiology, and as he well says, "Had he known the cause of the disease he would have known what it was." "Not knowing the cause he did not know where to look in the average text-book." Clinically the locality, the eruption, its peculiar characteristics, and the methods of its spread are all of value in dermatology. He does not attempt to discuss pathology, nor does he deal with very rare skin lesions which are so uncommonly met with that they are practically curiosities. After he began writing the present volume he found that Sabouraud had written in French a book upon Topographical Dermatology, but so far as is known the present volume is the only one which is in the English language along these lines. In the fifteen chapters an immense amount of useful information as to diagnosis and treatment will be found. From what has been said it is evident that the book will prove very useful to the general practitioner, but be of little value to the dermatological specialist.

NERVOUS BREAKDOWNS AND HOW TO AVOID THEM. By Charles D. Musgrove, M.D. The Funk & Wagnalls Co., New York, 1913. Price $1.00.

It is evident from the title of this book that its text is scarcely likely to become popular with medical men. We question, too, whether medical men will be prone to recommend it to their neurasthenic patients. It is pretty well filled with curious ideas, medical and otherwise, correct and incorrect. The publishers tell us that the author is "neither preachy nor scary, but informing, inspiring and helpful throughout." Perhaps this brief sentence will give our readers some idea of the book.

THE TREATMENT OF INTERNAL DISEASES. For Physicians and Students. By Professor Ortner. Edited with Additions by Nathaniel Bowditch Potter, M.D., and Translated by Frederick H. Bartlett, M.D. Second English Edition, Revised and Reset, from the Fifth German Edition. The J. B. Lippincott Co., Philadelphia, 1913.

The present edition in English is essential because Professor Ortner has extensively altered the fifth edition of his book which has proved so popular in Germany. The

American author has added copious notes in brackets, chiefly in connection with the therapeutic resources which are open to American and English physicians. He has also rewritten sections and added a chapter upon the treatment of neurasthenia. Unlike many books which claim to deal with the subject of treatment, this one is truly devoted to this matter alone. Various diseases are considered solely from their therapeutic standpoint, although when symptoms require treatment the underlying condition which produces these symptoms is necessarily discussed in order to make the therapeutic procedure rational.

LABORATORY MANUAL OF INVERTEBRATE ZOÖLOGY. By Gillman A. Drew, Ph.D. Second Edition, Revised. The W. B. Saunders Co., Philadelphia, 1913. Price $1.25.

The object of this book is to present a manual of laboratory directions such as are followed by the Class in General Zoölogy at the Marine Biological Laboratory at Woods Hole, Massachusetts. Certain well-known text-books on Biology have been largely used in its preparation. In other words, it does not profess to be an original contribution to Biology, but simply a handbook for the use of students who are working in laboratories with the object of obtaining a rudimentary knowledge of this subject.

SURGERY OF THE HEART AND LUNGS. By Benjamin Merrill Ricketts, Ph.B., M.D. The Grafton Press, New York, 1914.

Ricketts has put into this book an enormous amount of literary research reënforced by animal experimentation. It is supplemented in each of its sections by a most extensive bibliography. The first part is devoted to Surgery of the Heart, beginning with a chapter on Anatomy and Experimental Research, and followed by sections on Cardiomorphia, Ectocardia, Gunshot, Lacerated, and Incised Wounds, Cardioclasia, Cardiorrhaphy, Cardiotomy, Heart Sutures, Cardiac Aneurysm, Foreign Bodies, Cardioliths, Calcification, Abscess, Syphilitic Gummata, Gangrene, Tumors and Parasites.

The second section is devoted to Surgery of the Lungs and follows the same general scheme as indicated under the Heart. To those interested in surgery of these organs, and this includes all surgeons, this book will indicate not only the enormous work already accomplished, but the greater field lying open for study.

MECHANICAL TREATMENT OF ABDOMINAL HERNIA. By William Burton de Garmo, M.D. J. B. Lippincott Company, Philadelphia and London, 1913.

Because of the view universally accepted by surgeons and recognized by physicians as having a reasonable foundation, to the effect that practically all hernias present in otherwise able-bodied men and women should be radically cured, a book on the mechanical treatment would seem ill-timed. To the contrary, this work is not only more needed to-day than ever before, but fulfils better its purpose than any other work readily available to the general practitioner. It is brief, clear, sufficiently comprehensive, and will have as its accomplishment the prolongation of life and the increase of comfort and efficiency of thousands of individuals who except for such instruction as is given in this work would be relegated to the often careless and inefficient control of the instrument-maker. With this book every member of the profession should be familiar.

TREATMENT OF SEXUAL IMPOTENCE AND OTHER DISORDERS IN MEN AND WOMEN. By William J. Robinson, M.D. Critic and Guide Co., New York, 1913.

The author laments the fact that he is trammeled in his expressions by a real censorship which makes him write haltingly and hesitatingly where the clearest language is needful. Such interesting topics as Masturbation, Pollutions, Impotence, and Sexual Neurasthenia are discussed, and on the whole with sound common sense and acceptance of standard and recognized methods of treatment; hydrotherapy and rational living being accorded their proper value and drugs being regarded as of only incidental service. There is here and there

a slight discussion of topics from the ethical standpoint, not without interest even for the pure hygienist. In his last chapter the author states that he has long ago formed an opinion as to the prevalence of sexual disorders, and in accordance with this at least 50 per cent of the adult population of a civilized community suffer from sexual impotence or some sexual abnormality.

CORRESPONDENCE.

LONDON LETTER.

BY J. CHARLTON BRISCOE, M.D.

The outstanding event of the past month has naturally been the meeting of the International Congress of Medicine. It is thirty-two years since the last meeting was held in London, a period of time which has seen greater progress, we venture to say, in the science of medicine and surgery than any other period of equal length in the world's history. The assemblage of so many noted names in the medical world caused the public to take a great interest in the proceedings of the Congress, and the full reports of the discussions in the newspapers enabled them to gain a better grasp of the problems of medicine, and in the future will inspire intelligent coördination when further remedial measures for certain infectious diseases are proposed.

The most striking thing about the Congress was the insistence upon the necessity of boldly grappling with the problem of venereal disease, in order to prevent and limit its ravages. A most valuable discussion on the subject was held under the presidency of Professor Ehrlich, by the sections of naval and military medicine, jointly with the section of dermatology. From these discussions it was clear that the prejudice against salvarsan is fast disappearing, and only the question of dosage and method of administration remains to be settled. Another important discussion dealt more with the social side, the question of control and notification. There was a definite proposal before the Congress to institute a system of confidential notification; certain members, however, took exception to this proposal, as they thought it would lead to breach of confidence between doctor and patient. They thought the education of the public in the possibility and danger of disease was more important than notification. In spite of the dissentients a resolution was passed calling upon the governments of all countries represented, first, "to institute a system of confidential notification of the disease to the sanitary authority wherever such notification does not already obtain;" secondly, "to make systematic provision for the diagnosis and treatment of all cases of venereal disease not otherwise provided for." There was no objection to the second part of the resolution. The army medical officers made an interesting contribution to the discussion, and they recorded their belief that the introduction of salvarsan into the British army annually saved the state the cost of the hospital treatment of a battalion of infantry. Professor Wassermann gave it as his opinion that salvarsan was the mightiest weapon in the whole world of medicine.

In the surgical section the greatest interest was aroused by the papers read by certain American surgeons on bone transplantation. A crowded audience listened to Dr. Abbott when he explained his method of operation and showed his illustrated slides. Dr. Abbott also operated one day at the Royal National Orthopedic Hospital, and demonstrated his methods of curing clubfoot.

It is interesting to note that Professor Bateson, who gave the General Address on Heredity, and who is an acknowledged leader on this subject, does not go so far as some of his followers in proposing legislative restriction on marriage as a result of eugenic investigations. He agreed that it is

right to check reproduction among hopeless defectives, a reform that will be instituted shortly by the Mental Deficiency Bill, but he did not agree with the wholesale regulation of marriage by officials on eugenic lines, as he thought that such a course was bound to lead to grave disaster. He pointed out that the word "dull" and the Dutch word "dol" (mad) have the same origin, and he thought we might possibly rid the community of mania and leave it gravely invaded with dulness.

There is no doubt that the scientific side of the Congress was a great success, the papers read being of a high order and the discussions very instructive. The presence of so many experts gave an authoritative air to the proceedings, and the printed records of the meetings will form useful references for each subject discussed.

The social side of the Congress was equally successful, and the numerous entertainments, garden parties, etc., were well patronized. The King gave a garden party at Windsor Castle, and it was attended by a large number of the members of the Congress. Excursions were made to such places as Cambridge, Harrogate, Brighton, and Bath, and parties were conducted over other places of interest in London itself. The medical colleges situated in the metropolis gave numerous receptions, usually combined with exhibitions of medical interest. The Royal Army Medical College at Millbank gave a successful soirée, at which could be seen an exhibition of the uniforms of the different armies of the world, at various periods of history. It was interesting to note the difference in the weight of equipment required to be carried by the soldiers of the different countries. Another exhibit showed the emergency ration issued to the various armies, the simplest being the slab of plain chocolate issued to the French soldiers. Some of the emergency rations looked capable of providing quite an elaborate meal. A large number of medical men with their families visited the new King's College Hospital at Camberwell, which was thrown open to inspection. The honorary staff acted as guides. As much interest was shown in the dynamo and engineering and culinary departments as in the hospital proper. Surprise was expressed at the size of the buildings as correlated to the number of patients, some of the Russian doctors considering that the wards should hold four times as many patients as is intended. The Americans thought the buildings should have been spread over a greater area, but were much astonished to learn the price of land in London. The hospital will be opened the first week of October for the reception of patients, etc.

We hope that our visitors have carried away with them very pleasant impressions of their stay in England, and that they found time to see something of the country itself after their strenuous work in the Congress sessions.

As we anticipated in a former letter, the findings of the Royal Commission on the medical teaching in the University of London have met with a considerable amount of criticism. Sir Henry Morris has written a series of articles in the *Times* in which he criticizes very strongly some of the proposals of the Commissioners, particularly in regard to clinical teaching. He thinks the introduction of the organization known as the "Hospital Unit" will destroy at once the features which are so characteristic of the British hospitals, by doing away with the independence of the individual medical schools, and by cutting down the number of teachers at our hospitals. The introduction of lecture-demonstrations to mass audiences of students on the German plan would do away with much of the bedside teaching by clinicians of experience which has proved so valuable in the past. There is no doubt, however, that while the proposals of the Royal Commission are regarded with considerable distrust, there is a wide-spread feeling that the training of medical students is not carried out in the most effective fashion, and that more money and laboratories are needed, especially in the teaching of the final subjects. The appearance of the report will

probably stimulate teachers in London to bring forward constructive proposals of their own, which will introduce much needed reforms while preserving the features so characteristic of the British hospitals.

The question of providing hospital accommodation on a self-supporting basis for people of moderate means is one which has been receiving a good deal of attention of late. There is a very large class of people who do not wish to be treated in charitable institutions and are yet utterly unable to pay the heavy fees demanded in modern nursing homes. A new hospital is to be opened in the autumn which will do something toward filling the gap. It will be called the Empire Hospital, and it is designed to meet the needs of Colonial visitors falling ill in London, as well as of Londoners themselves. The building will contain about fifty beds, it will be run strictly on a business footing, and will be open to all. The charges will depend upon the room chosen, the lowest being about three guineas a week. The situation of the hospital in the open space of Vincent Square will insure a certain freedom from the noise and dust of traffic.

Another institution on the same lines is about to be started by the Freemasons of England. A Masonic Nursing Home has already been successfully started in Edinburgh, and the Masonic craft in England is anxious to start a similar one in London. It is hoped that the new institution will be on a self-supporting basis and that it will provide nursing-home facilities not only for Freemasons but also for their wives and families.

OPERATIVE TREATMENT OF FRACTURES.

To the Editor of the THERAPEUTIC GAZETTE.

SIR: There are so many detailed methods proposed for the operative treatment of fracture that the careful student of literature who is anxious to abstract therefrom the best for the good of his patients is sometimes at a loss to make a choice. Therefore it seems wise that all who have had large experience in this line of work should express their preference. Personally, I have found some objection to the use of plates, having performed secondary operations incident not so much to the plates themselves as to the irritation due to imperfect or inadequate application of external splints. I have found one end of the plate to become loose on account of a screw failing to hold, thus causing a chronic irritation, a huge callous growth. Pegs and nails are subject to the same disadvantage, and wire seems to have a habit of breaking as soon as tension is put upon it. The operator too often relies upon his internal splint rather than upon external dressings, which should often be supplemented by traction and should in many cases take the form of plaster investments. The supplementary treatment should receive as careful attention as though no internal splint had been applied. In my secondary operations I have removed the foreign bodies and held the bones in apposition by kangaroo tendons, using traction and splints as indicated. Obvious advantages attendant thereon are incident to the fact that the foreign body is promptly absorbed, and causes neither irritation nor pressure necrosis, nor superabundant callus. Moreover, the healing was prompt and better results were obtained than from the use of non-absorbable buried splints.

Very respectfully at your service,

A. A. BROWNING, M.D.

PARK CITY, UTAH.

PITUITARY AND URINARY FLOW.

To the Editor of the THERAPEUTIC GAZETTE.

SIR: I have just read your editorial on "The Relationship of Pituitary Extract to Urinary Flow," and I am reminded of a single use of it with this end in view by me last winter. It was a condition of urinary suppression in a grave case of malarial hemoglobinuria, relieved by hypodermics of pituitrin. Very truly yours,

CYRUS THOMPSON.

JACKSONVILLE, NORTH CAROLINA.